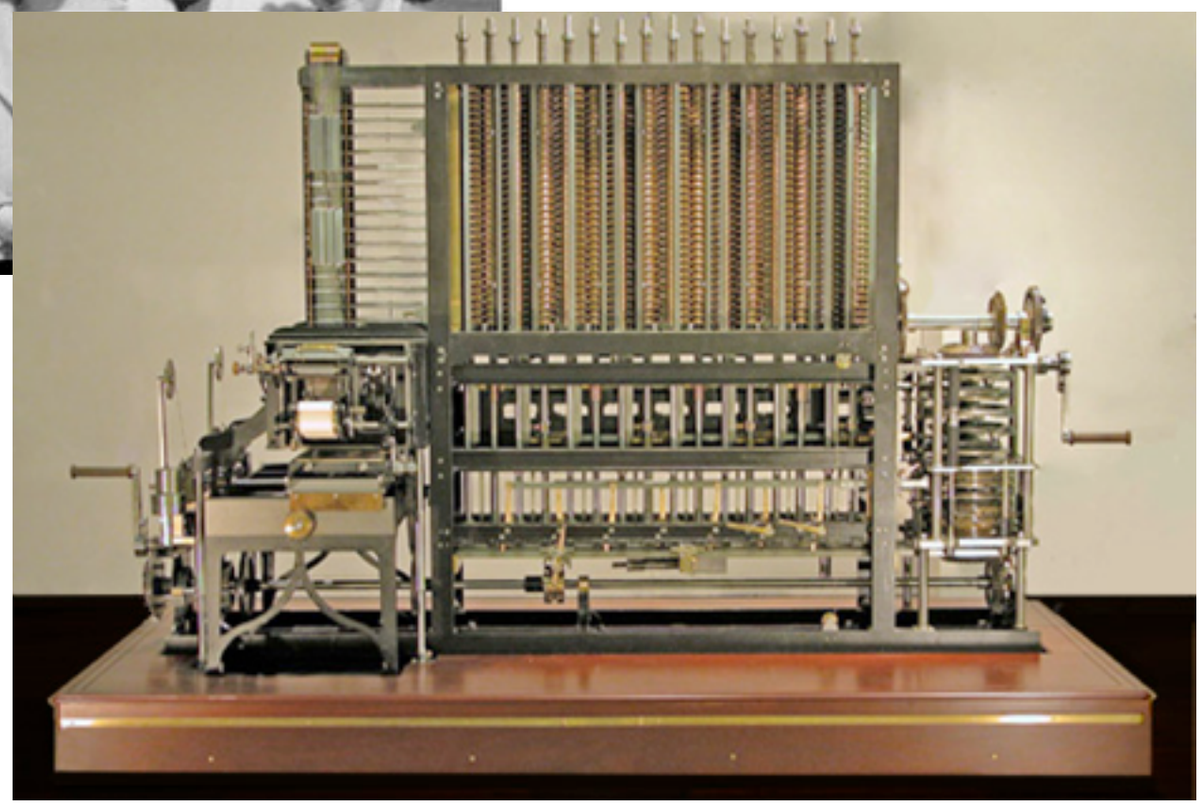
advent of the computer

History of Information

April 6, 2010



announcement

2011 Annual California Cognitive Science Conference

"Cognitive Change: Metamorphoses of the Mind"

Saturday, April 30th 9:00 am - 6:00 pm

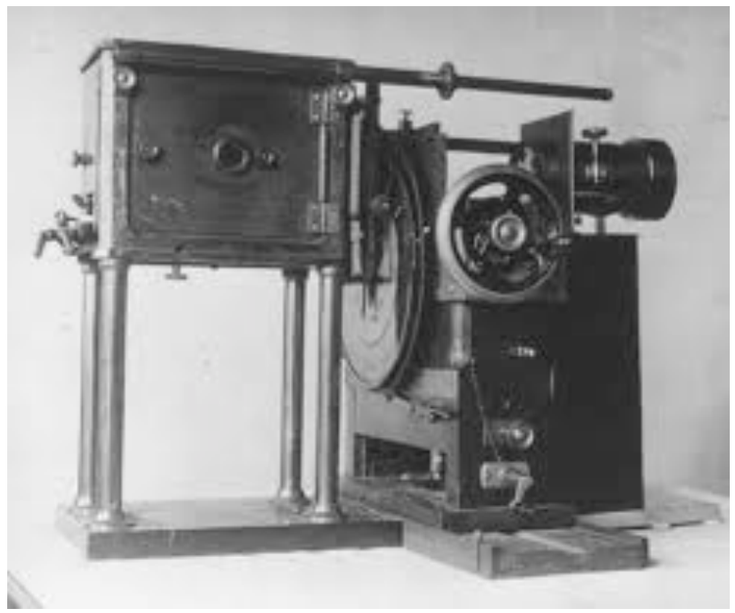
Martin Luther King Jr. Student Union Building

University of California, Berkeley

Hosted by the *Cognitive Science Student Association*

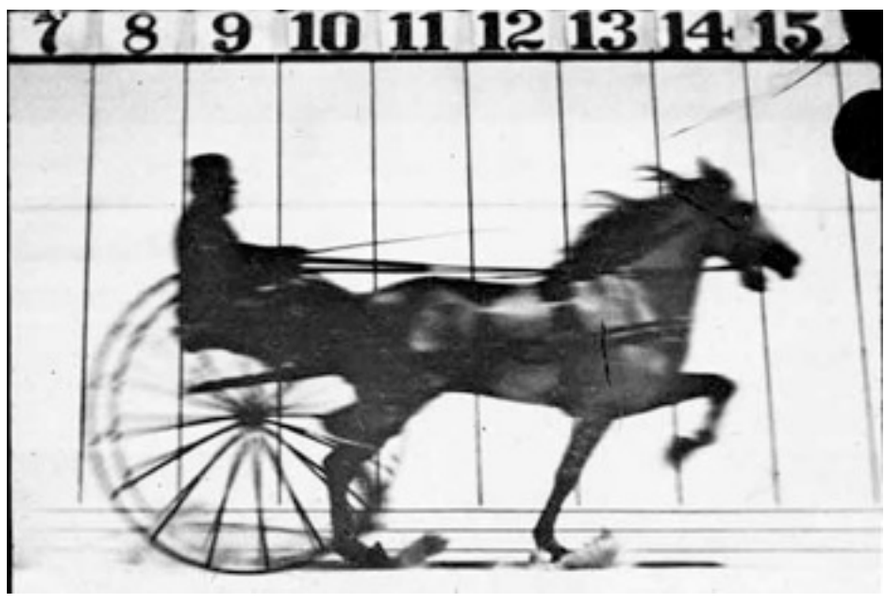
Research abstracts ... until Friday, April 22nd!

Conference Website: cssa.berkeley.edu/cogscicon
Registration Website: cogscicon.eventbrite.com



Eadweard Muybridge
1830-1904

SF MOMA
until June 7



aob

Oldest working television set expected to sell for £5,000

Britain's oldest working television set, which was manufactured by Marconi in 1936, is expected to sell for more than £5,000 at auction.

aob

Paul Baran, Internet Pioneer, Dies at 84

By KATIE HAFNER
Published: March 27, 2011

Paul Baran, an engineer who helped create the technical underpinnings for the Arpanet, the government-sponsored precursor to today's Internet, died Saturday night at his home in Palo Alto, Calif. He was 84.

Charles Dharapak/Associated Press

The cause was complications from lung cancer, said his son, David.

In the early 1960s, while working at the RAND Corporation in Santa Monica, Calif., Mr. Baran outlined the fundamentals for packaging data into discrete bundles, which he called "message blocks." The bundles are then sent on various paths around a network and reassembled at their destination. Such a plan is known as "packet switching."

Mr. Baran's idea was to build a distributed communications network, less vulnerable to attack or disruption than conventional networks. In a series of technical papers published in the 1960s he suggested that networks be designed with redundant routes so that if a particular path failed or was destroyed, messages could still be delivered through another.

Mr. Baran's invention was so far ahead of its time that in the mid-1960s, when

aob

exams

homework & class participation 35
midterm 25
final 40

tactics

-do the reading

- come to class; take part in discussions

- answer the questions

coming up

12 Apr: Information and crisis (Megan Finn)

Required reading:

- Steven J. Jackson, Paul N. Edwards, Geoffrey C. Bowker, Cory P. Knobel. 2007. Understanding Infrastructure: History, heuristics, and cyberinfrastructure Policy. *First Monday*. 12(6)

Optional material:

- Ibrahim, M. (2009). Peeling the onion: The case of the Information Technology Club project in Egypt. Dissertation.
- Warschauer, M. (2003). Dissecting the "Digital Divide": A Case Study in Egypt. The Information Society, 19(4), 297-304.
- Wheeler, D. (2006). Empowering Publics: Information Technology and Democratization in the Arab World-Lessons from Internet Cafe's and Beyond. SSRN eLibrary.
- Weidat, N., Benard, C., Stahl, D., Kildani, W., O'Connell, E., & Grant, A. (2008). The Kefaya Movement: A Case Study of a Grassroots Reform Initiative. RAND. Pages 8-32.
- Mitchell, T. (1991). America's Egypt: Discourse of the Development Industry. Middle East Report, 169, 18-34.
- Elyachar, J. (2002). Empowerment Money: The World Bank, Non-Governmental Organizations, and the Value of Culture in Egypt. Public Culture, 14(3), 493-514.

coming up

12 Apr: Information and crisis (Megan Finn)

Assignment Instructions

We are going to have a debate about the following motion:
"Twitter was necessary for the overturn of Mubarak in Egypt."
-If your last name starts with A-J, argue FOR this motion.
-If your last name starts with K-Z, argue AGAINST this motion.
Use the Jackson article about information infrastructure, and at least one resource about Egypt (provide a full citation) to make your argument! Remember to cite sources for all of the arguments you repeat. Please feel free to use non-English sources.

[Note: The debate will be a pseudo-Oxford style debate. See http://intelligencesquaredus.org for inspiration or to listen to sample debates. Everyone should plan on participating either as a debater or asking questions. If you won't be participating, please say so in your response, or a note to me.]

Kefaya Movement: A Case Study of a Grassroots Reform Initiative. RAND. Pages 8-32.
- Mitchell, T. (1991). America's Egypt: Discourse of the Development Industry. Middle East Report, 169, 18-34.
- Elyachar, J. (2002). Empowerment Money: The World Bank, Non-Governmental Organizations, and the Value of Culture in Egypt. Public Culture, 14(3), 493-514.

coming up

14 Apr: Storage and search

Required reading:

- Viktor Mayer-Schönberger, "Useful Void: The Art of Forgetting in the Age of Ubiquitous Computing," KSG Faculty Research Wroking Paper Series RWP07-022
- Bush, Vannevar. 1945. As We May Think , Atlantic Monthly; 176 (1): 101-108

Additional material:

- NPR, Intelligence Squared Debate, 2008. Did Google Violate Its 'Don't Be Evil' Motto?
- Berners-Lee, Tim. 2000. Chapters 1-3, pp. 1-34 in Weaving the Web. New York City: HarperCollins.

as you search, try to estimate
how much google has on you

send in conclusions by April 14 am
for discussions in class

our route

where are we
and what are we talking about**?**

inventions & precedents

the demand side

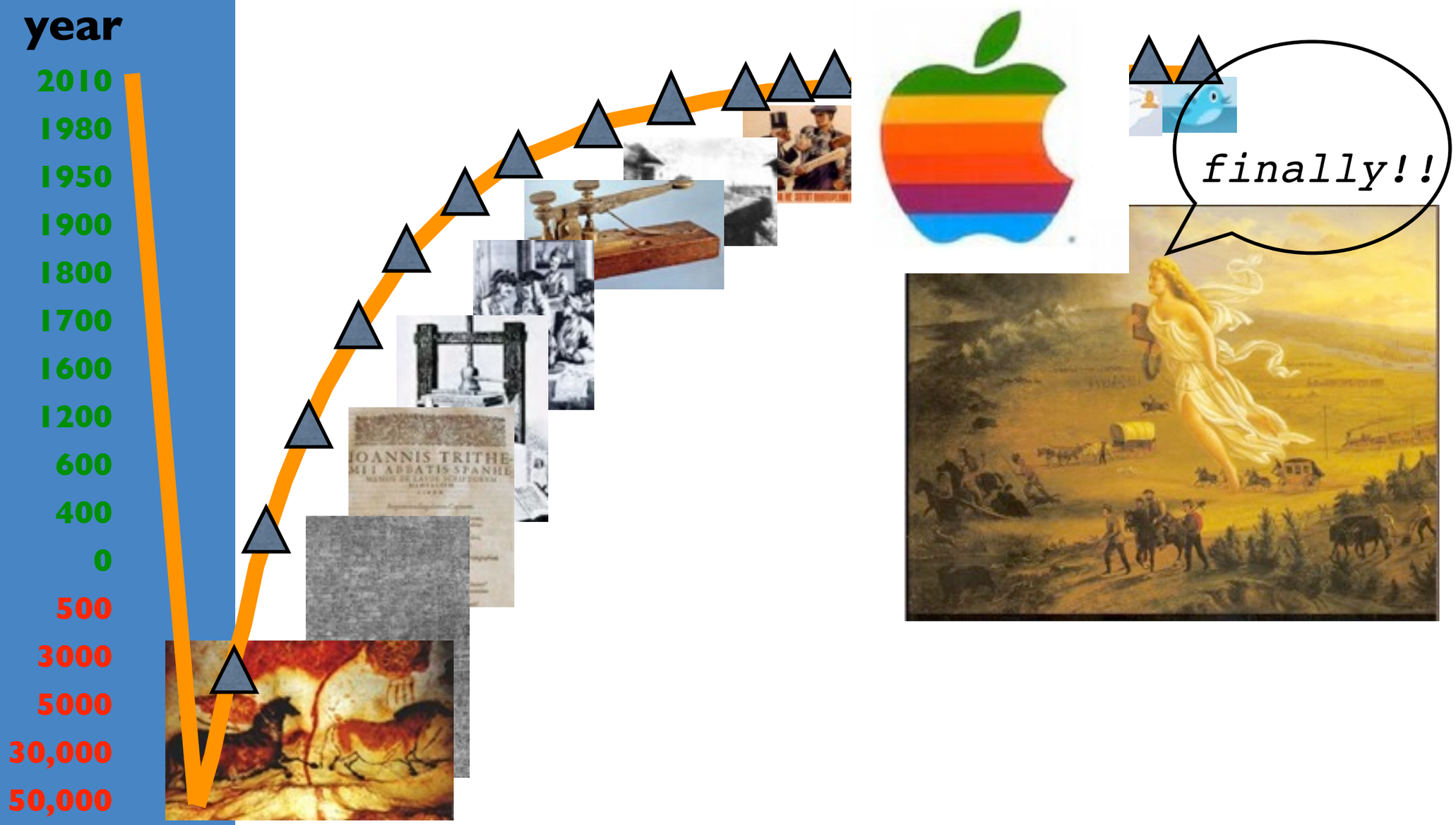
government

business

military

changing business

familiar territory?



familiar territory?

year

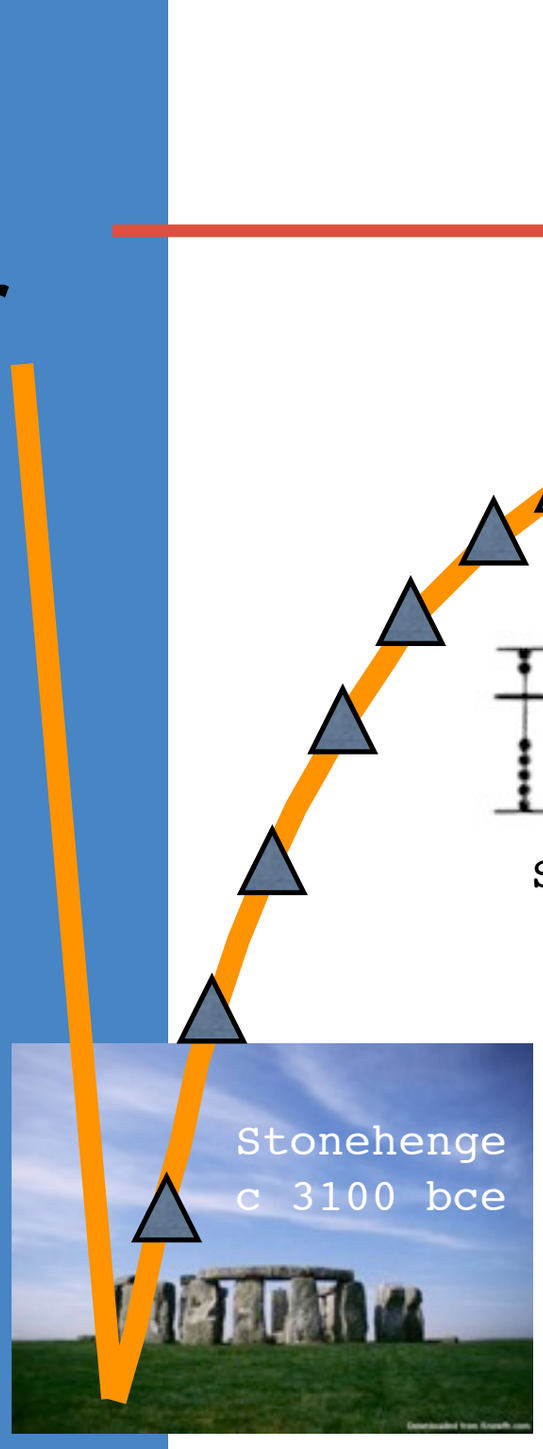
2010
1980
1950
1900
1800
1700
1600
1200
600
400
0
500
3000
5000
30,000
50,000

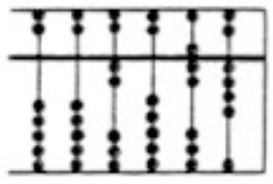
week 1 2 3 4 5 6 7 8 10 11 12 13 14 15 week

not so fast?

year

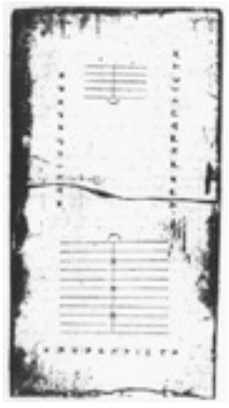
2010
1980
1950
1900
1800
1700
1600
1200
600
400
0
500
3000
5000
30,000
50,000





Suan Pan
c 1200

Salamis
tablet
c 300
bce



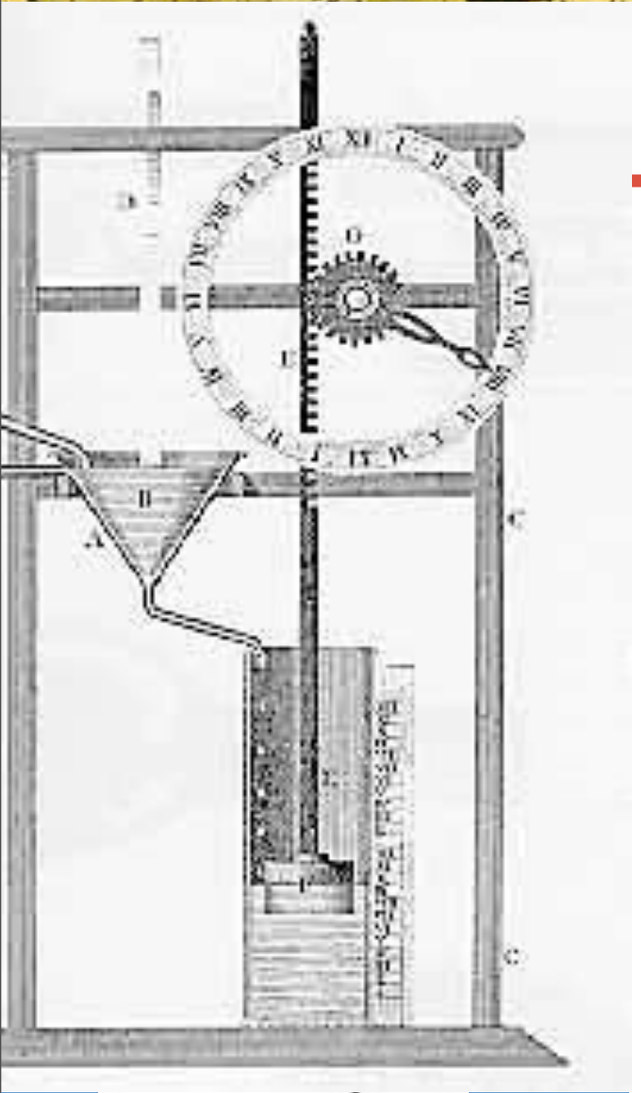
antikythera c 200 bce

Olympic link to early 'computer'

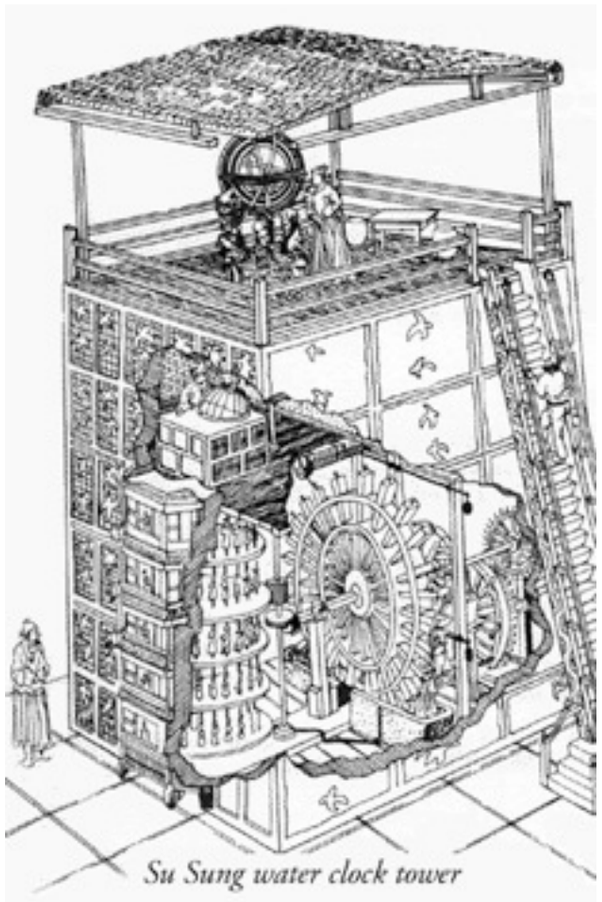
week

1 2 3 4 5 6 7 8 10 11 12 13 14 15

week



calculating?

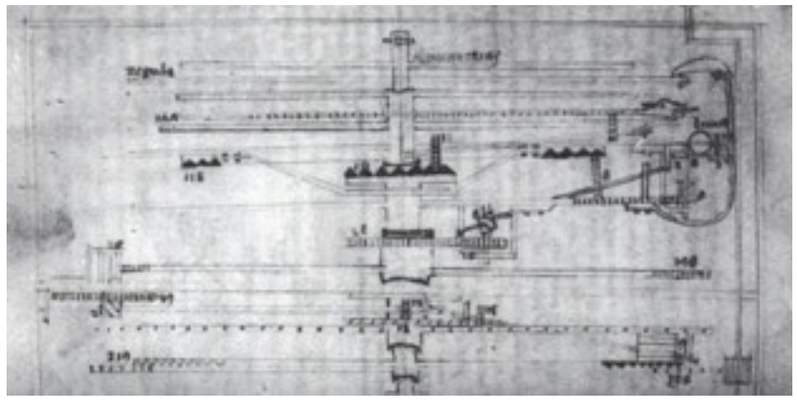


3500 bce: sundials

1400 bce: Egyptian water clocks

700 ce: hourglasses

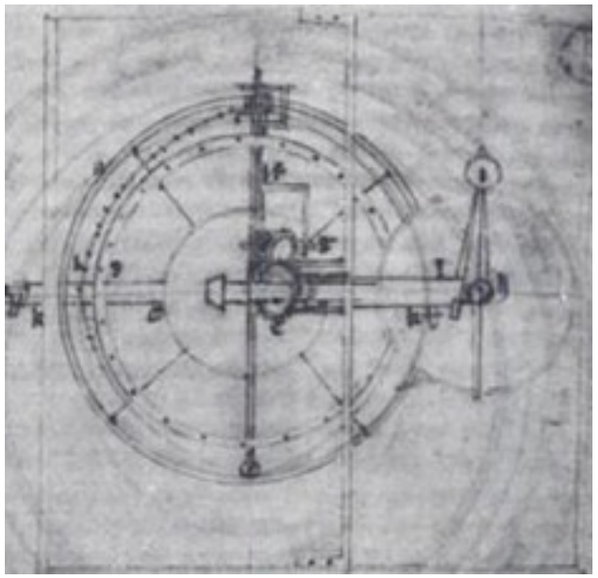
1086: Su Sung's water tower



automata

Richard of Wallingford
1292-1336

1300: mechanical clocks
Richard of Wallingford
celestial instruments & St Albans' clock



86 *The Antiquity* Chap. VI.

modum dentata, quæ una motione coacta, verſando faciunt effectus, varietateſque motionum: in quibus moventur Sigilla, vertuntur Metæ, calculi aut Tona projiciuntur,

Chap. VI. *of Clock-work.* 87

Clocks, and ſome other *Automata*, might have their beginning there; or that Clock-work (which had long been buried in oblivion) might be revived there. But

Derham, *The Artificial Clock Maker*, 1696

beyond time

17th century calculations

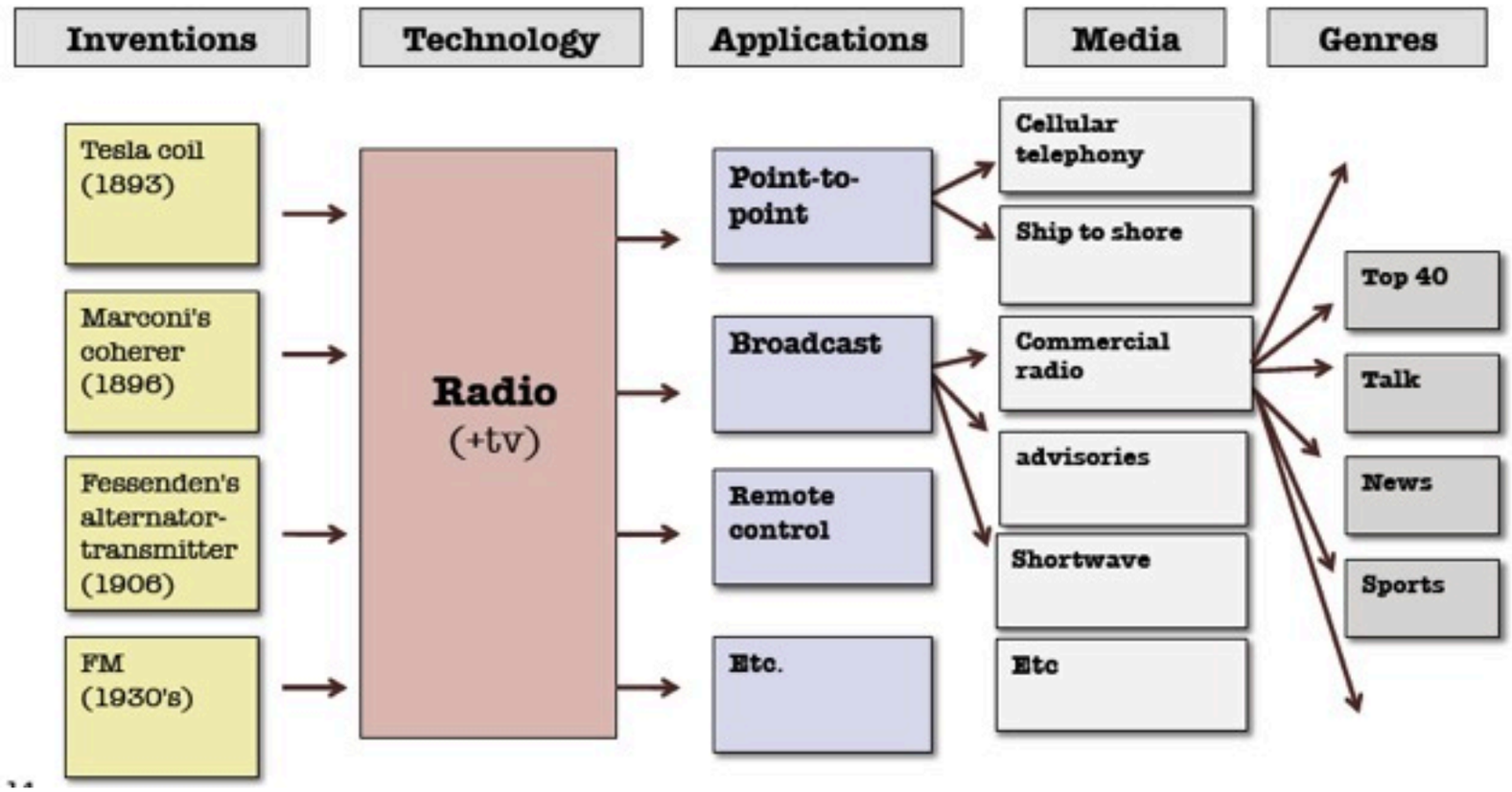
Schickard's astronomical calculator

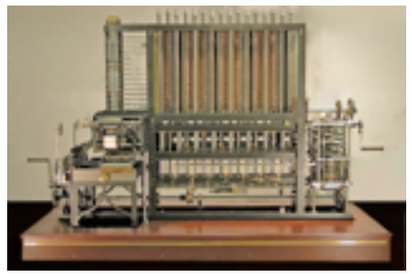
Pascal's calculator

Leibniz's binary calculator

what is *the computor*

Inventions, Technologies, Applications, Media





computer technology

Inventions	Technology	Applications	Media	Genres
clock	**computer**	calculating	mainframe	logarithms
loom		recording	desktop	ballistics
vacuum tube		sorting	laptop	registration
transistor		controlling	tablet	logistics
chip		*commun-icating*	car(d)s	dtp
disc			watches	email
			servers	bbs
			the net	
			the web ...	

determinism again?

what determines technology?

individual inventors (and investors)

business / customers

government

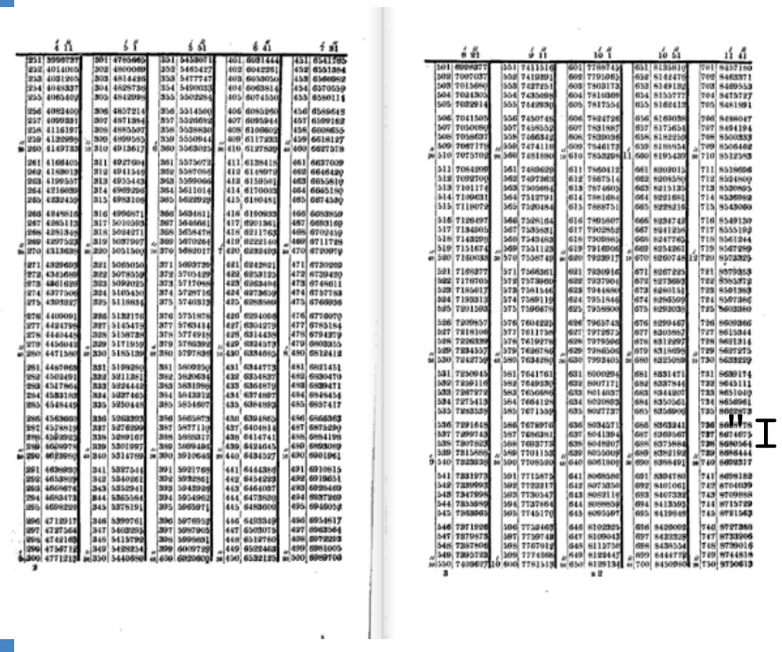
military / intelligence

science / education

individual calculation

John Napier
1550–1617

Charles Babbage
1791–1871



John Napier

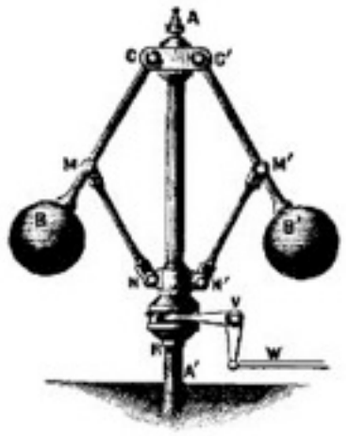
Mirifici Logarithmorum Canonis Descriptio, 1614

Charles Babbage

Table of Logarithms from 1 to 108000
1827

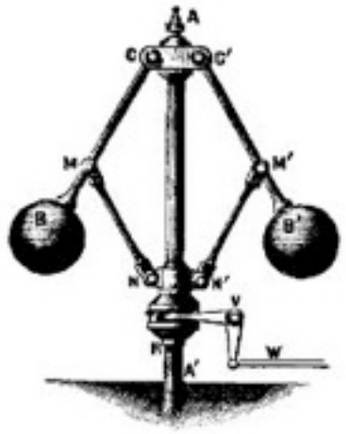
"I wish to God these calculations had been executed by steam"

1821



on the economy of machinery and manufactures

chapters



on the economy of machinery and manufactures

CHAPTER VIII.

REGISTERING OPERATIONS.

Pedometer. Counting Machines for Carriage. Steam-engine, § 45. Machine for measuring Calicoes, 46. Tell-tale, 47. Instrument to measure Liquor drawn from Casks, 48. To measure Liquor remaining in Casks, 49. Gas-meter, 50. Water-meter, 51. Machine for registering the Average of fluctuating Forces. Barometer Clock, 52. Alarums, Repeating Clocks and Watches, 53.

1: So … rs

M … touch

2: Ac …

3: Re …

… ame kind,

t…

4: Inc …

5: Extending the time of action of forces

... watches & clocks ..

automatons

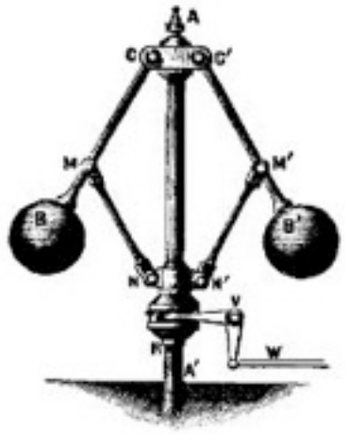
6: Saving time in natural operations

12: On the method of observing manufacturies

...

19: On the division of labor

20 On the mental division of labour



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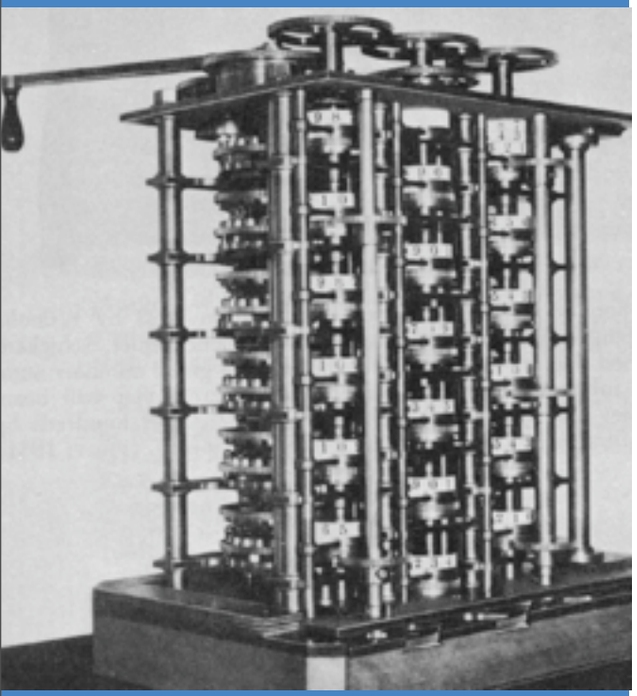
CHAPTER XIX.

ON THE DIVISION OF MENTAL LABOUR.

Great French Tables of Logarithms, § 183 to 187. On performing Arithmetical Calculations by Machinery, 189. Explanation of Mathematical Principle. Table of Square Numbers with Differences, 190. Illustration by three Clocks, 191.

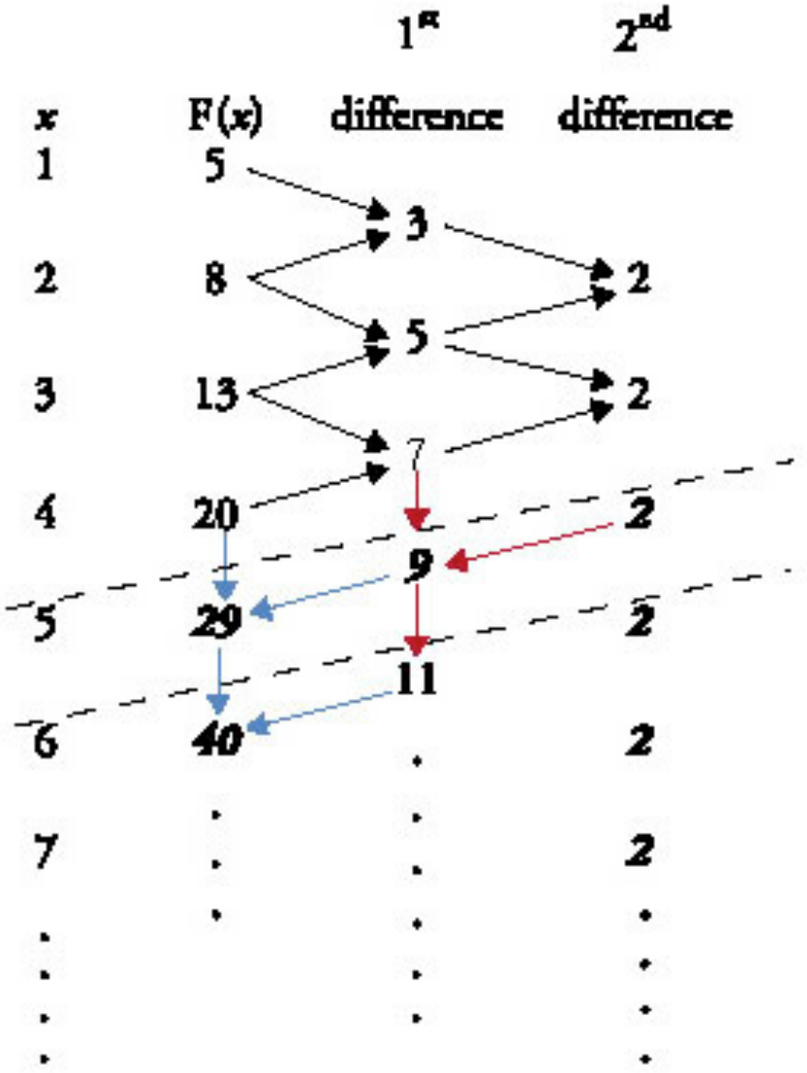


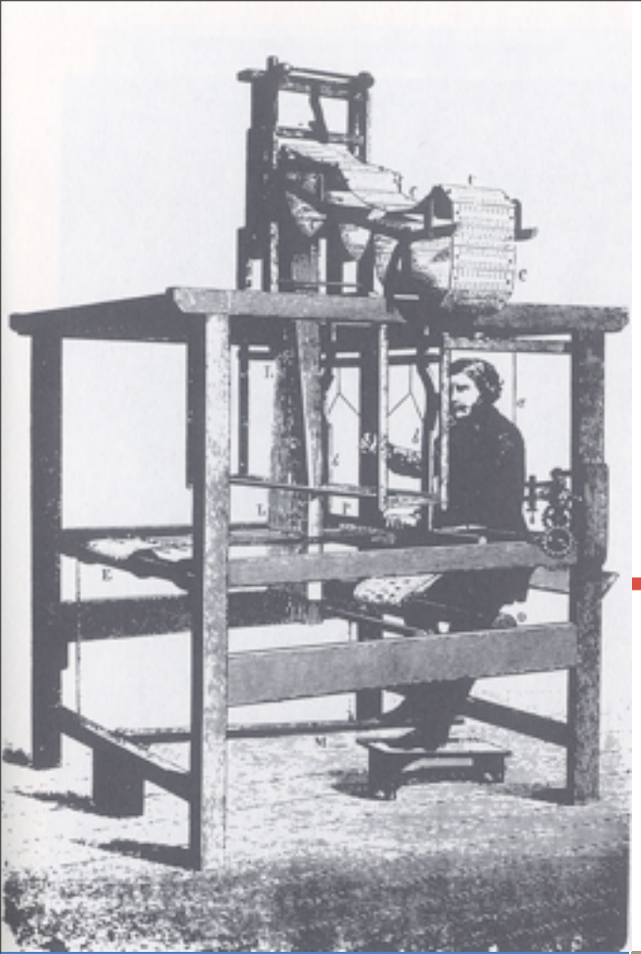
differential engine

200 ON THE DIVISION OF MENTAL LABOUR.

Repetitions of Process.	Movements.	Clock A. Hand set to I.	Clock B. Hand set to III.	Clock C. Hand set to II.
		TABLE.	First differences.	Second differences.
1	Pull A.	A. strikes 1	. . . . .	. . . .
	— B.	The hand is advanced (by B.) 3 divisions . .	B. strikes 3	. . . .
	— C.	. . . . .	The hand is advanced (by C.) 2 divisions . .	C. strikes 2
2	Pull A.	A. strikes 4	. . . . .	. . . .
	— B.	The hand is advanced (by B.) 5 divisions . .	B. strikes 5	. . . .
	— C.	. . . . .	The hand is advanced (by C.) 2 divisions . .	C. strikes 2
3	Pull A.	A. strikes 9	. . . . .	. . . .
	— B.	The hand is advanced (by B.) 7 divisions . .	B. strikes 7	. . . .
	— C.	. . . . .	The hand is advanced (by C.) 2 divisions . .	C. strikes 2
4	Pull A.	A. strikes 16	. . . . .	. . . .
	— B.	The hand is advanced (by B.) 9 divisions . .	B. strikes 9	. . . .
	— C.	.....	The hand is advanced (by C.) 2 divisions . .	C. strikes 2
5	Pull A.	A. strikes 25	. . . . .	. . . .
	— B.	The hand is advanced (by B.) 11 divisions .	B. strikes 11	. . . .
	— C.	. . . . .	The hand is advanced (by C.) 2 divisions . .	C. strikes 2
6	Pull A.	A. strikes 36	. . . . .	. . . .
	— B.	The hand is advanced (by B.) 13 divisions .	B. strikes 13	. . . .
	— C.	. . . . .	The hand is advanced (by C.) 2 divisions . .	C. strikes 2

$f(x) = x^2 + 4$





analytical engine

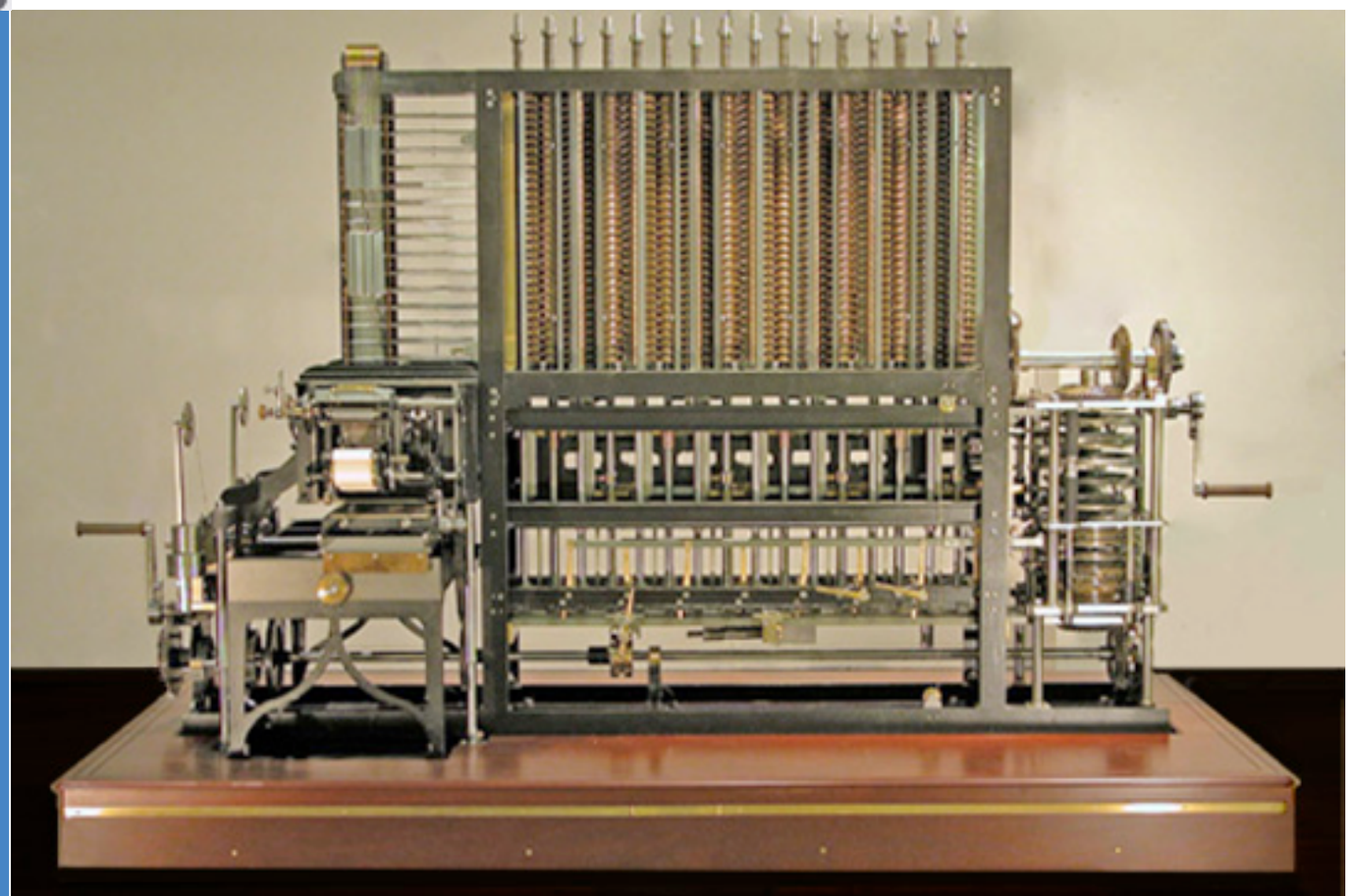
general purpose machine

programmable

storing

looping

branching



Ada Byron/Lovelace

Ada Lovelace
1815–1852

"a machine that not only would have foresight, but could act on that foresight"

"I want to put in something about Bernoulli's Number, in one of my notes, as an example of how an explicit function, may be worked out by the engine, without having been worked out by human head and hands first" --Lovelace to Babbage, 1843

"Analytical Engine *weaves algebraical patterns* just as the Jacquard loom weaves flowers and leaves'

Taylor's *Scientific Memoirs*, 1843

pretensions

[people tend to]

"first, overrate what we find to be … remarkable, and secondly, by a sort of natural reaction, to undervalue the true state of the case ... The Analytical Engine has no pretension whatever to originate anything"

Ada Byron,

Taylor's *Scientific Memoirs*, 1843

Per George Scheutz
1785–1873

Edvard Scheutz
1822–1881

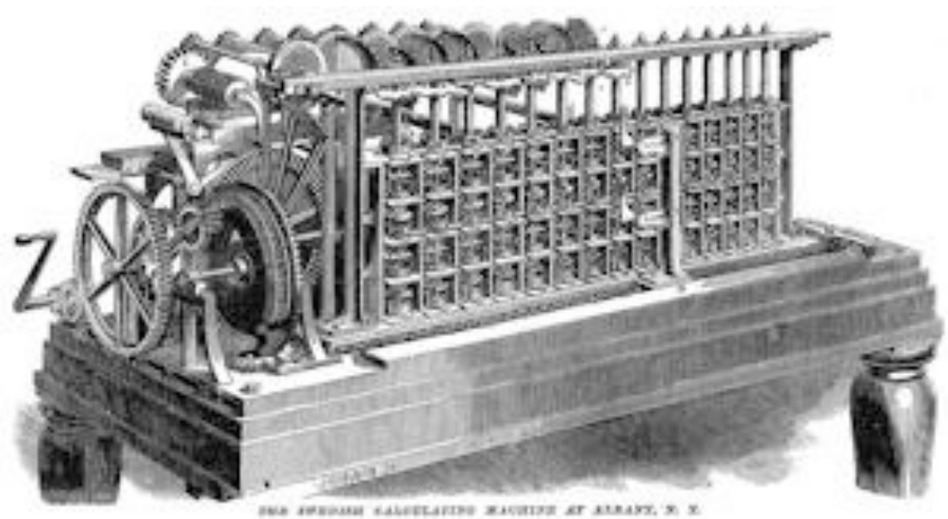
difference engines

George & Edvard Scheutz

Scheutz Difference Engine, with printer c 1853

Dudley Observatory, Schenectady

British Government, actuarial calculations

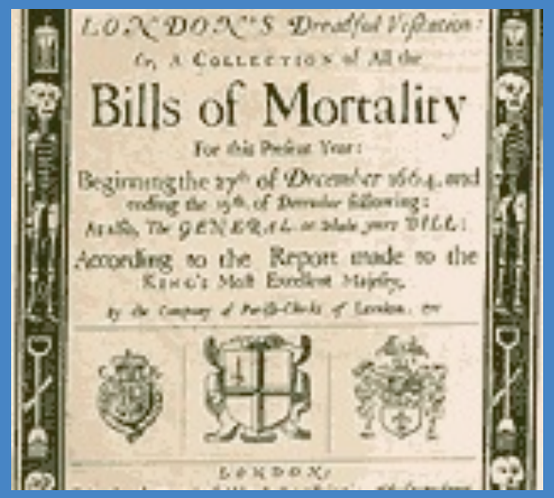


on the demand side

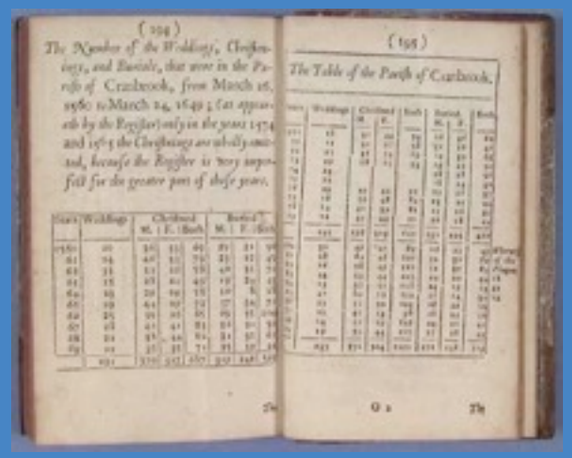
who might want these machines?

why?

what would they want?


LONDON'S Dreadful Visitation:
Or, A COLLECTION of All the
Bills of Mortality
For this Present Year:
Beginning the 27th of December 1664, and ending the 19th of December following:
Wherein, The GENERAL or Whole years BILL:
According to the Report made to the KING's Most Excellent Majesty,
by the Company of Parish-Clerks of London, &c.
LONDON:


A generall Bill for this present year, ending the 19 of December 1665. according to the Report made to the KINGS most Excellent Majest.
By the Company of Parish Clerks of London, &c.
The Diseases and Casualties this year.
Abortive and Stillborne 617 | Executed 21 | Palsie 30
Aged 1545 | Flox and Small Pox 655 | Plague 68596
Ague and Feaver 5257 | Found dead in Streets, fields, &c. 23 | Planet 6
Apoplex and Suddenly 116 | French Pox 86 | Plurisie 19
Bedrid 12 | Frighted 25 | Poysoned 2
Blasted 5 | Gout and Sciatica 27 | Quinsie 35
Bleeding 16 | Grief 46 | Rickets 557
Bloody Flux, Scowring & Flux 185 | Griping in the Guts 1288 | Rising of the Lights 497
Burnt and Scalded 8 | Hang'd & made away themselves 7 | Rupture 34
Calenture 2 | Headmould-shot & Mastif-fallen 14 | Scurvy 11
Cancer, Gangrene and Fistula 56 | Jaundice 120 | Slunges and Swine pox 2
Canker, and Thrush 61 | Impostume 225 | Spina Ventosa, Ulcers, broken and bruised 2
Childbed 625 | Kill'd by severall accidents 46 | Limbs 53
Chrisomes and Infants 1258 | Kings Evill 86 | Spleen 14
Cold and Cough 63 | Leprosie 2 | Spotted Feaver and Purples 1929
Collick and Winde 134 | Lethargy 14 | Stopping of the Stomach 348
Consumption and Tisick 4808 | Livergrown 21 | Stone and Strangury 58
Convulsion and Mother 1036 | Meagrom and Headach 12 | Surfet 2343
Distracted 5 | Measles 7 | Teeth and Worms 2614
Dropsie and Tympany 1478 | Murthered and Shot 9 | Vomiting 71
Drowned 53 | Overlaid & Starved 45 | Worms 7
Christened: Males 5114, Females 4853, In all 9967 | Buried: Males 48568, Females 48317, In all 97302 | Of the Plague 68596
Increased in the Burials in the 130 Parishes and at the Pest-house this year 79059
Increased of the Plague in the 130 Parishes and at the Pest-house this year 68590


(154)
The Number of the Weddings, Christenings, and Burials, that were in the Parish of Cranbrook, from March 26. 1580. to March 24. 1649. (as appeareth by the Register) only in the years 1582 and 1583 the Christnings are wholly omitted, because the Register is very imperfect for the greater part of those years.
(155)
The Table of the Parish of Cranbrook.

government information: statistics and the state

registration

bills of mortality

births & marriages

parish members

population

national statistics

Statistics: a word lately introduced to express a view or survey of any kingdom, country, or parish

***Encyclopaedia Britannica*, 1797**

THE

STATISTICAL ACCOUNT

OF

SCOTLAND.

DRAWN UP FROM THE COMMUNICATIONS

OF THE

MINISTERS

OF THE

DIFFERENT PARISHES.

BY SIR JOHN SINCLAIR, BART.

VOLUME TWENTY-FIRST.

"*Ad consilium de republica dandum, caput est nosse rempublicam.*"
CICERO de Orat. lib. ii.

EDINBURGH:
PRINTED AND SOLD BY WILLIAM CREECH;
AND ALSO SOLD BY J. DONALDSON, A. GUTHRIE, W. LAING,
AND JO. FAIRBAIRN, EDINBURGH; T. CADELL, J. DEB-
RETT, AND J. SEWEL, LONDON; DUNLOP AND WIL-
SON, GLASGOW; ANGUS AND SON, ABERDEEN.

M,DCC,XCIX.


STATUTES OF CALIFORNIA.

FIRST SESSION

OF THE

LEGISLATURE

BEGUN THE 15th DAY OF DEC. 1849, AND ENDED THE 22d DAY OF APRIL, 1850, AT THE CITY OF PUEBLO DE SAN JOSÉ.

WITH AN APPENDIX AND INDEX.

SAN JOSÉ.
J. WINCHESTER, STATE PRINTER.
1850.

making states

An act concerning...

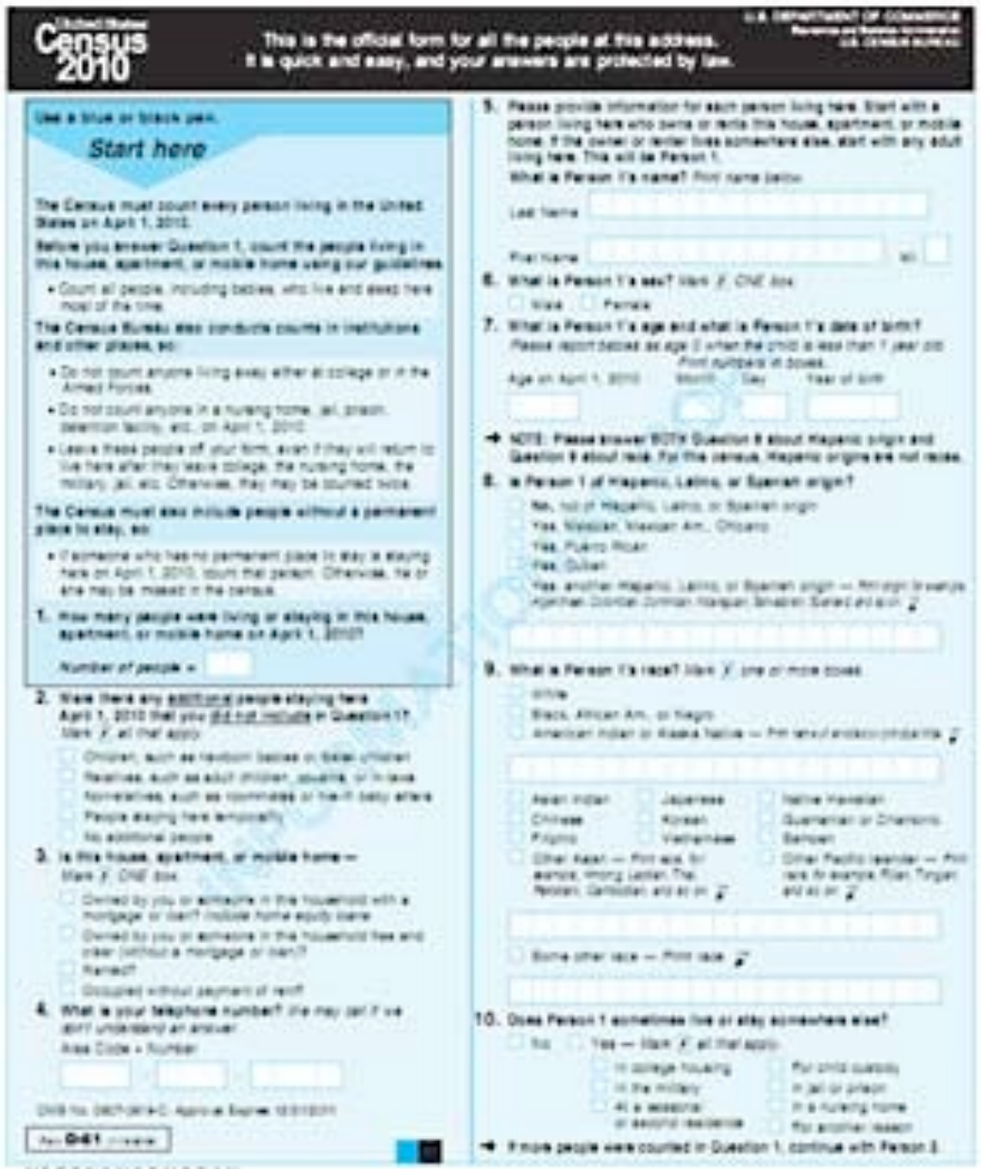
1. public archive
2. state printer
3. pilots for SF
4. comptroller
5. treasurer
6. sec. of state
8. translator
11. AG
14. Supreme Court
30. incorporation of cities
36. commissioner of deeds
41. notaries
49. lawful fences
48. incorporation of towns
53. weights & measures
55. limited partners
59. recorder's office
64. officers of health
67. surveyors
69. librarian
72. register of wills
89. marks & brands
90. reporter
93. conveyances
95. common law
117. incorp. of colleges
123. assayer

Statutes of California, 1849-50

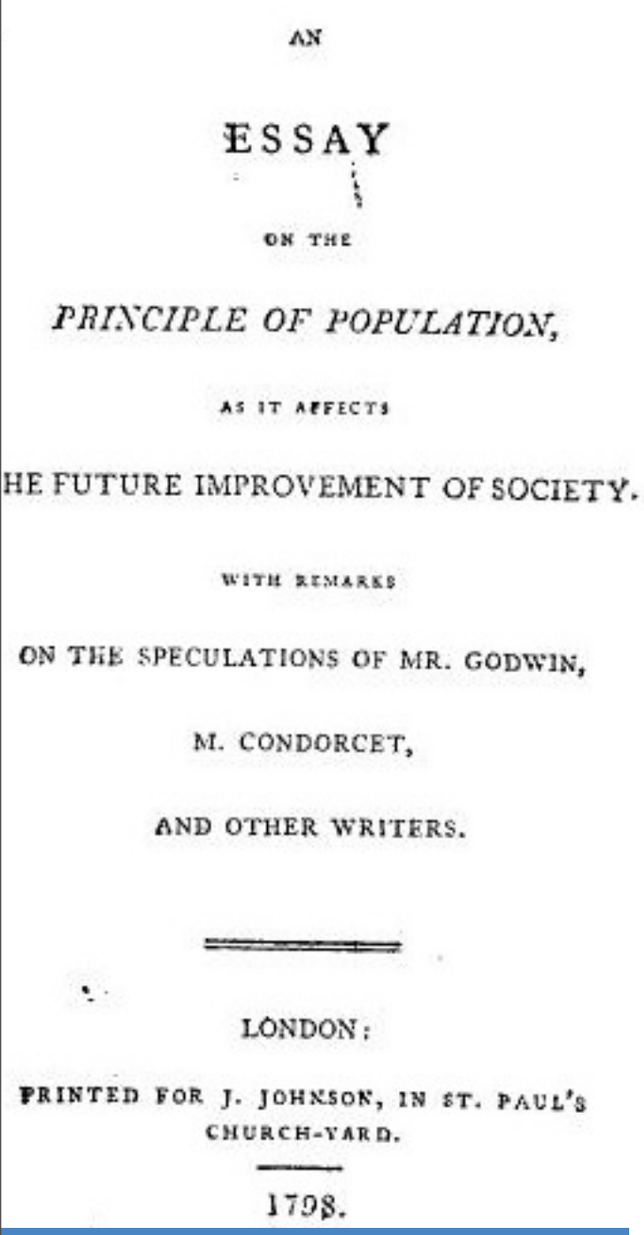
counting

CENSUS OF 1850.

STATES AND TERRITORIES.	Whites.	Free colored.	Slaves.	Total.
Maine	581,813	1,356	.....	583,169
New Hampshire	317,456	520	.....	317,976
Massachusetts	985,450	9,064	.....	994,514
Rhode Island	143,875	3,670	.....	147,545
Connecticut	363,099	7,693	.....	370,792
Vermont	313,402	718	.....	314,120
New York	3,048,325	49,069	.....	3,097,394
New Jersey	465,509	23,810	226	489,555
Pennsylvania	2,258,160	53,626	.....	2,311,786
Delaware	71,169	18,073	2,290	91,532
Maryland	417,943	74,723	90,368	583,034
Virginia	894,800	54,333	472,528	1,421,661
North Carolina	553,028	27,463	288,548	869,039
South Carolina	274,563	8,960	384,984	668,507
Georgia	521,572	2,931	381,682	906,185
Kentucky	761,413	10,011	210,981	982,405
Tennessee	756,836	6,422	239,459	1,002,717
Ohio	1,955,050	25,279	.....	1,980,329
Indiana	977,154	11,262	.....	988,416
Mississippi	295,718	930	309,878	606,526
District of Columbia	37,941	10,059	3,687	51,687
Illinois	846,034	5,436	.....	851,470
Michigan	395,071	2,583	.....	397,654
Louisiana	255,491	17,462	244,809	517,762
Missouri	592,004	2,618	87,422	682,044
Alabama	426,514	2,265	342,844	771,623
Arkansas	162,189	608	47,100	209,897
Florida	47,203	932	39,310	87,445
Wisconsin	304,756	635	.....	305,391
Iowa	191,881	303	.....	192,214
Texas	154,034	397	58,161	212,592
California	91,635	962	.....	92,597
Minnesota Territory	6,608	39	.....	6,077
New Mexico Territory	61,525	22	.....	61,547
Oregon Territory	13,087	207	.....	13,294
Utah Territory	11,330	24	26	11,380
Aggregate	19,553,068	434,495	3,204,313	23,191,876



decline to abundance



AN

ESSAY

ON THE

PRINCIPLE OF POPULATION,

AS IT AFFECTS

THE FUTURE IMPROVEMENT OF SOCIETY.

WITH REMARKS

ON THE SPECULATIONS OF MR. GODWIN,

M. CONDORCET,

AND OTHER WRITERS.

LONDON:

PRINTED FOR J. JOHNSON, IN ST. PAUL'S CHURCH-YARD.

1798.

"In Britain, however, the first census was taken, not out of a constitutional requirement, but as a way of resolving the Malthusian population controversy ... The 1800 Census Act was designed principally to determine whether or not the population was actually increasing."

-- Martin Campbell-Kelly,
"Change in the British Census," 1996

"And it came to pass in those days, that there went out a decree from Caesar Augustus that all the world should be taxed. ... And Joseph also went up from Galilee, out of the City of Nazareth, into Judaea, unto the City of David, which is called Bethlehem; (because he was of the house of David:) to be taxed with his espoused wife, being great with child."

government records

taxpayers

military eligible

aliens

racial groups

the poor

professions

midwives

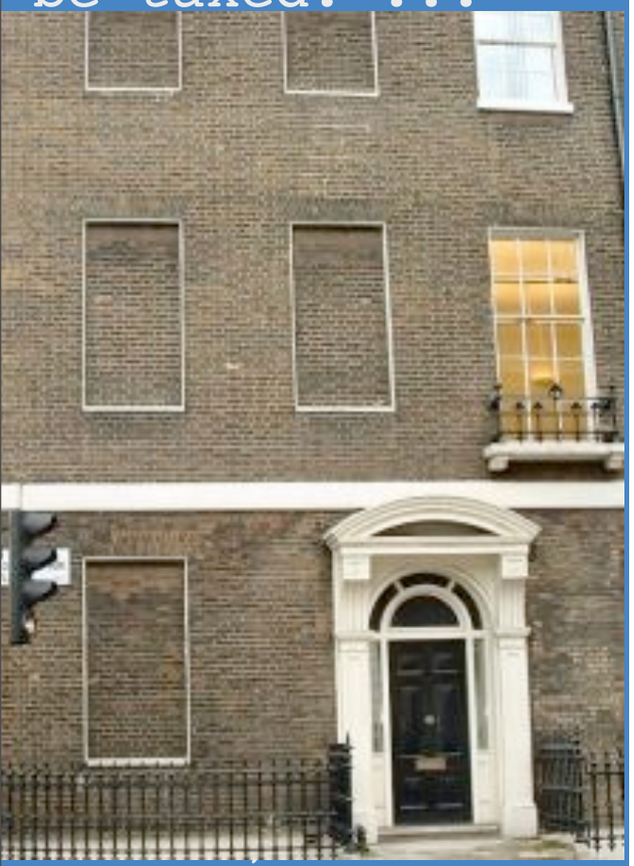
prostitutes

cars

'National Insurance'

social security

"And it came to pass in those days, that there went out a decree from Caesar Augustus that all the world should be taxed. ...



taxed with his espoused wife, being great with child."

government records

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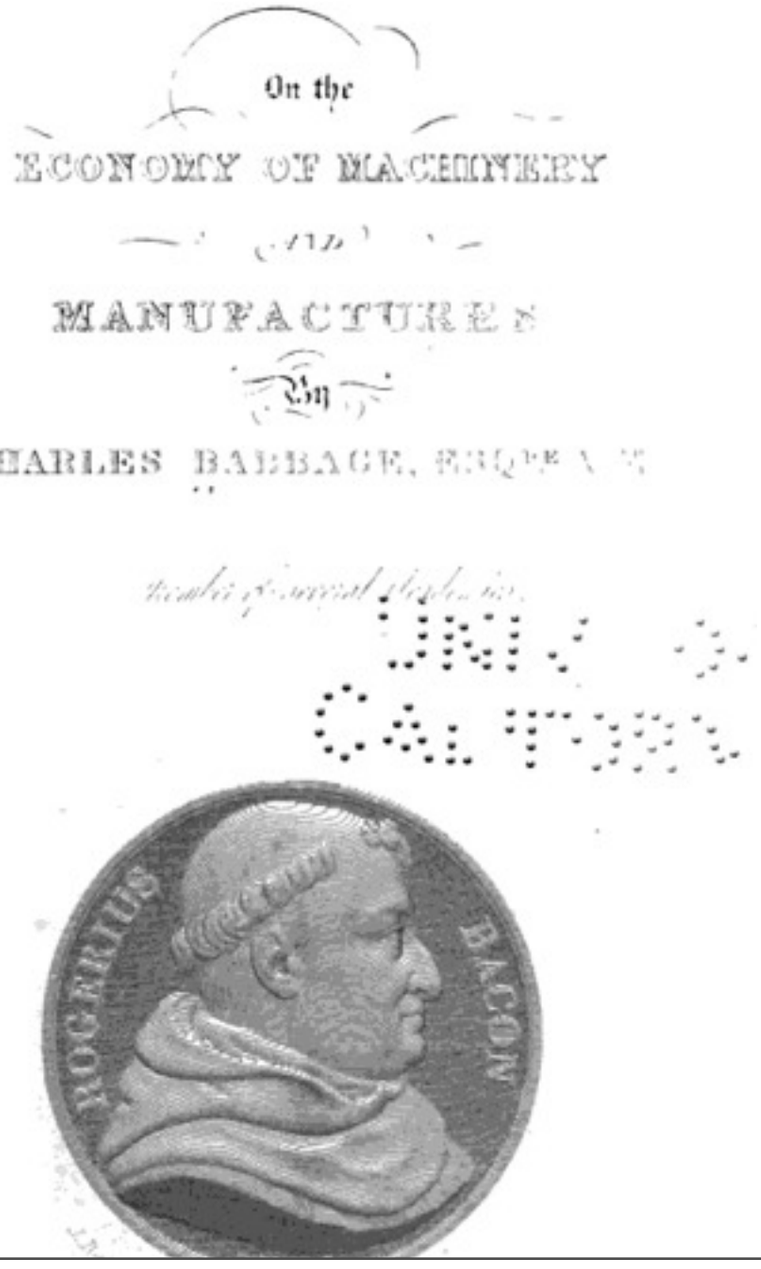
'National Insurance'

social security

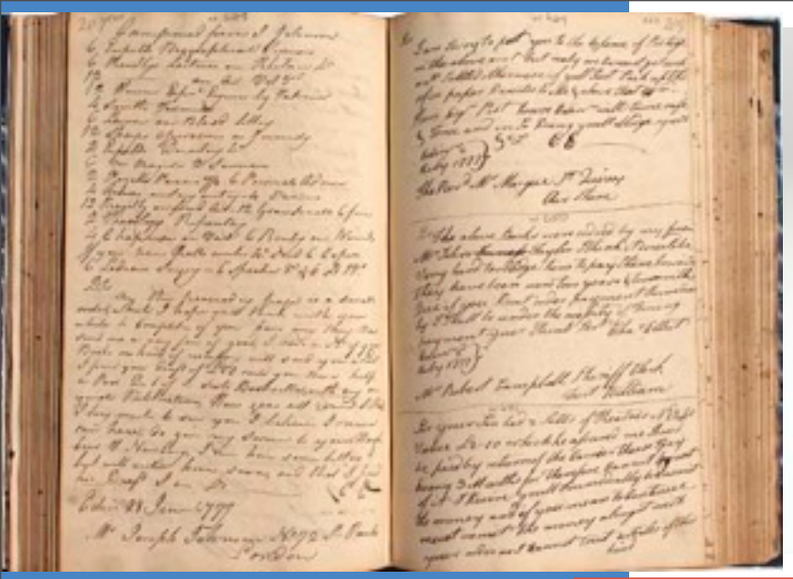
business interests


On the
ECONOMY OF MACHINERY
AND
MANUFACTURES
By
CHARLES BABBAGE, ESQ.
ROGERIUS BACON

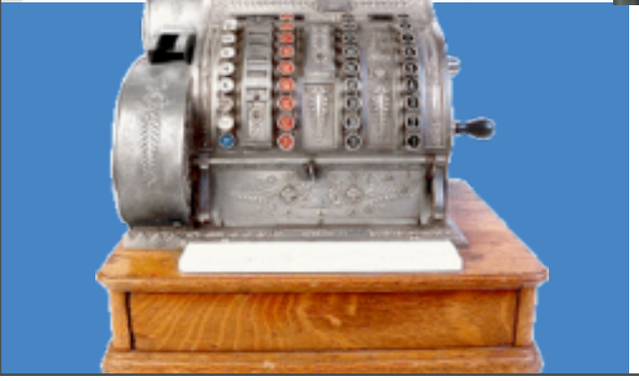
business interests

sorting information: the clearing house

"In a large capital, each bank receives, through its numerous customers, checks payable by every other; and if clerks were sent round to receive the amount in banknotes due from each, it would occupy much time, and be attended with some risk and inconvenience. ... In London this is avoided, by making all checks paid in to bankers pass through what is technically called The Clearing House. In a large room in Lombard Street, about thirty clerks from the several London bankers take their stations, in alphabetical order, at desks placed round the room; each having a small open box by his side, and the name of the firm to which he belongs in large characters on the wall above his head. From time to time other clerks from every house enter the room, and, passing along, drop into the box the checks due by that firm to the house from which this distributor is sent. The clerk at the table enters the amount of the several checks in a book previously prepared, under the name of the bank to which they are respectively due." ["1839, £954 million was cleared--$250 billion in today's money." --Campbell-Kelly & Aspray]



information technology



carbon paper
Wedgewood, 1806

typewriter
Remington, 1874

calculator

Burroughs, 1892

cash register
mechanical register, 1884

"No simple economic explanation
... America was gadget happy"

--Campbell-Kelly and Aspray,
Computer, 1996

information workers / computers

clerks (UK)

1871: 262,100
1891: 534,622

1911: 918,186

female clerks

1891: 17,859
1911: 117,057

1921, women 46% of all clerks

typewriter girls

1931, 212,296 female typists
5,155 male typists

"[An] Enumeration shall be made within three Years after the first Meeting of the Congress of the United States, and within every subsequent Term of ten Years, in such Manner as they shall by Law direct."

back to government

Spain, 1787

US, 1790

UK, 1801

Year	Population	Gain		Clerks
1900	76,212,168	13,232,402	21.0	
1890	62,979,766	12,790,557	25.5	
1880	50,189,209	11,630,838	30.2	2000
1870	38,558,371	7,115,050	22.6	1495
1860	31,443,321	8,251,445	35.6	483
1850	23,191,876	6,128,523	35.9	
1840	17,063,353	4,202,651	32.7	28
1830	12,860,702	3,222,249	33.4	
1820	9,638,453	2,298,572	33.1	
1810	7,239,881	1,931,398	36.4	
1800	5,308,483	1,379,269	35.1	
1790	3,929,214	-	-	uters 36

Herman Hollerith
1860–1929

tabulating

Hollerith

Electronic Tabulating Machine

1890 Census

"This apparatus works unerringly as the mills of the gods, but beats them hollow as to speed."

—*The Electrical Engineer*, 11 Nov 1891.

the punch card

government to business

Hollerith

Tabulating Machine Company

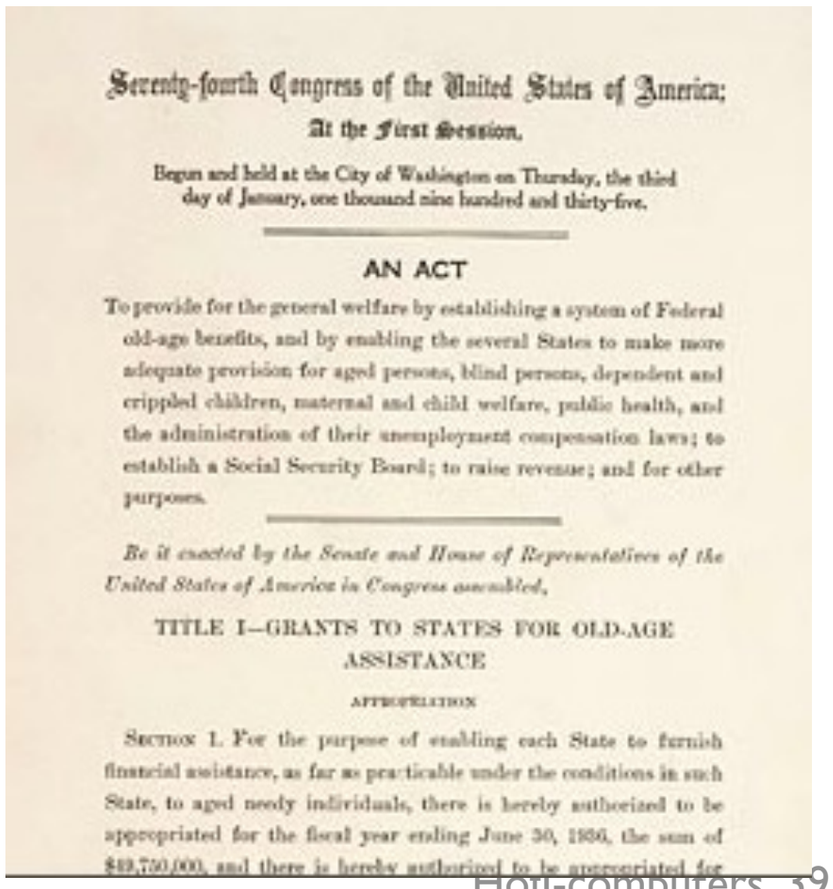
CTR:
Computing-Tabulating-Recording Company

Thomas Watson
NCR to CTR to ...

the new deal

Social Security Act, 1935

"the world's largest bookkeeping job"



Seventy-fourth Congress of the United States of America;

At the First Session,

Begun and held at the City of Washington on Thursday, the third day of January, one thousand nine hundred and thirty-five.

AN ACT

To provide for the general welfare by establishing a system of Federal old-age benefits, and by enabling the several States to make more adequate provision for aged persons, blind persons, dependent and crippled children, maternal and child welfare, public health, and the administration of their unemployment compensation laws; to establish a Social Security Board; to raise revenue; and for other purposes.

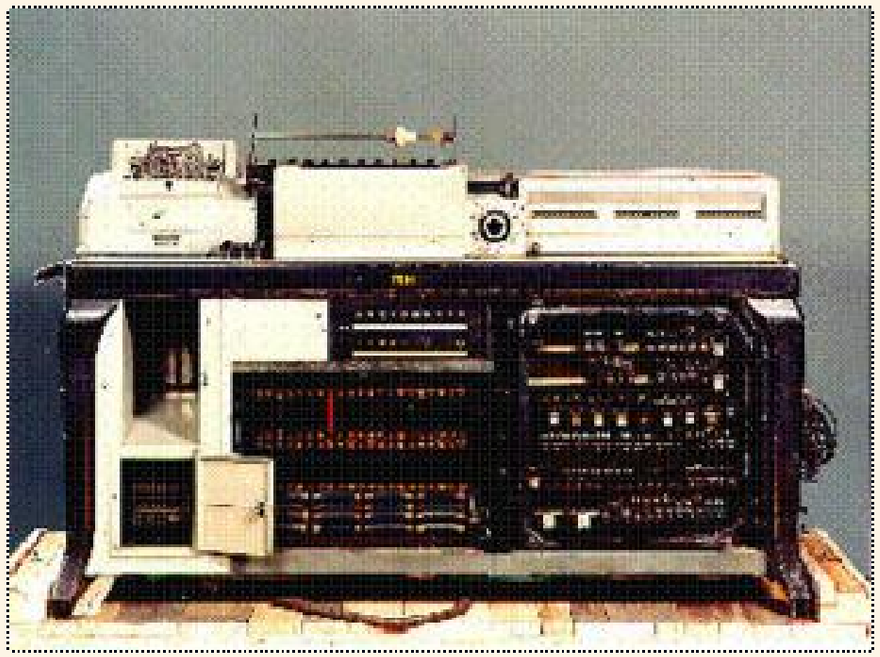
Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

TITLE I—GRANTS TO STATES FOR OLD-AGE ASSISTANCE

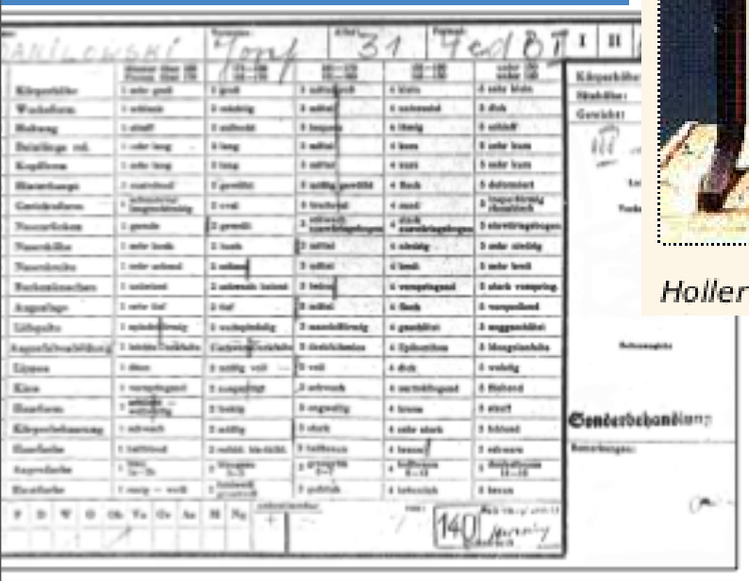
APPROPRIATION

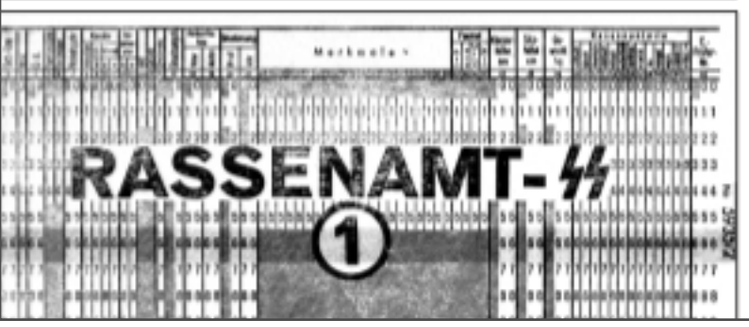
SECTION 1. For the purpose of enabling each State to furnish financial assistance, as far as practicable under the conditions in such State, to aged needy individuals, there is hereby authorized to be appropriated for the fiscal year ending June 30, 1936, the sum of $49,750,000, and there is hereby authorized to be appropriated for

controlling numbers



Hollerith-Maschine Dehomag D11, die 1933 in Deutschland





controlling people

"the Nazi census"
--Aly & Roth, 2004

IBM D11

Census, 1933, 1939

Labor Book, 1935

Health Pedigree book, 1936

Registry of the Populace, 1939

Blood (high, average, acceptable inferior), 1940

Personal Identification Number, 1944

still registering

Interpol chief calls for global electronic identity card system

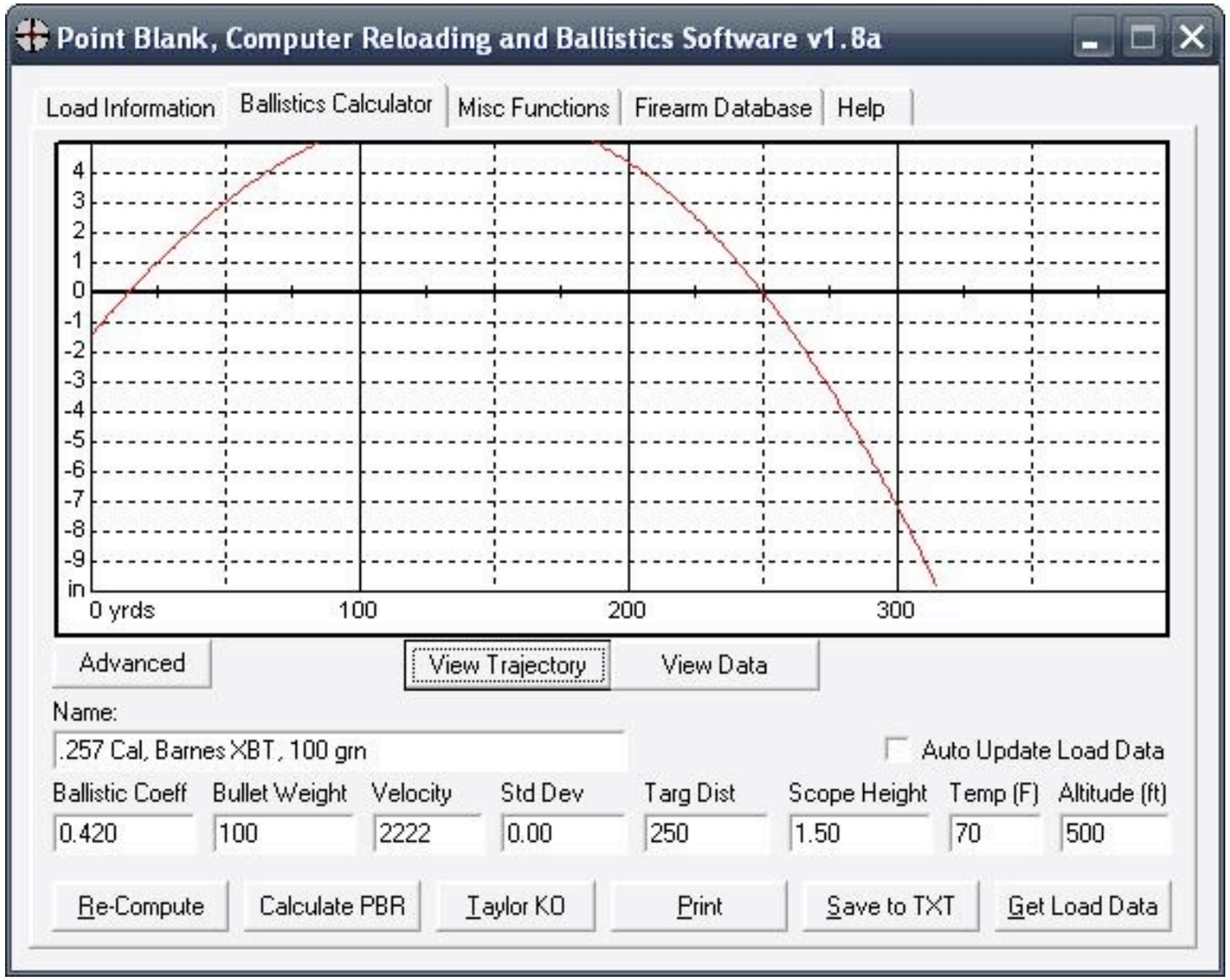
Posted on 06 April 2011.

BOOKMARK ...

The head of INTERPOL has emphasized the need for a globally verifiable electronic identity card (e-ID) system for migrant workers at an international forum on citizen ID projects, e-passports, and border control management.

Speaking at the fourth Annual EMEA ID WORLD summit, INTERPOL Secretary General Ronald K. Noble said that regulating migration levels and managing borders presented security challenges for countries and for the world that INTERPOL was ideally-placed to help address.

military takeover



military processing

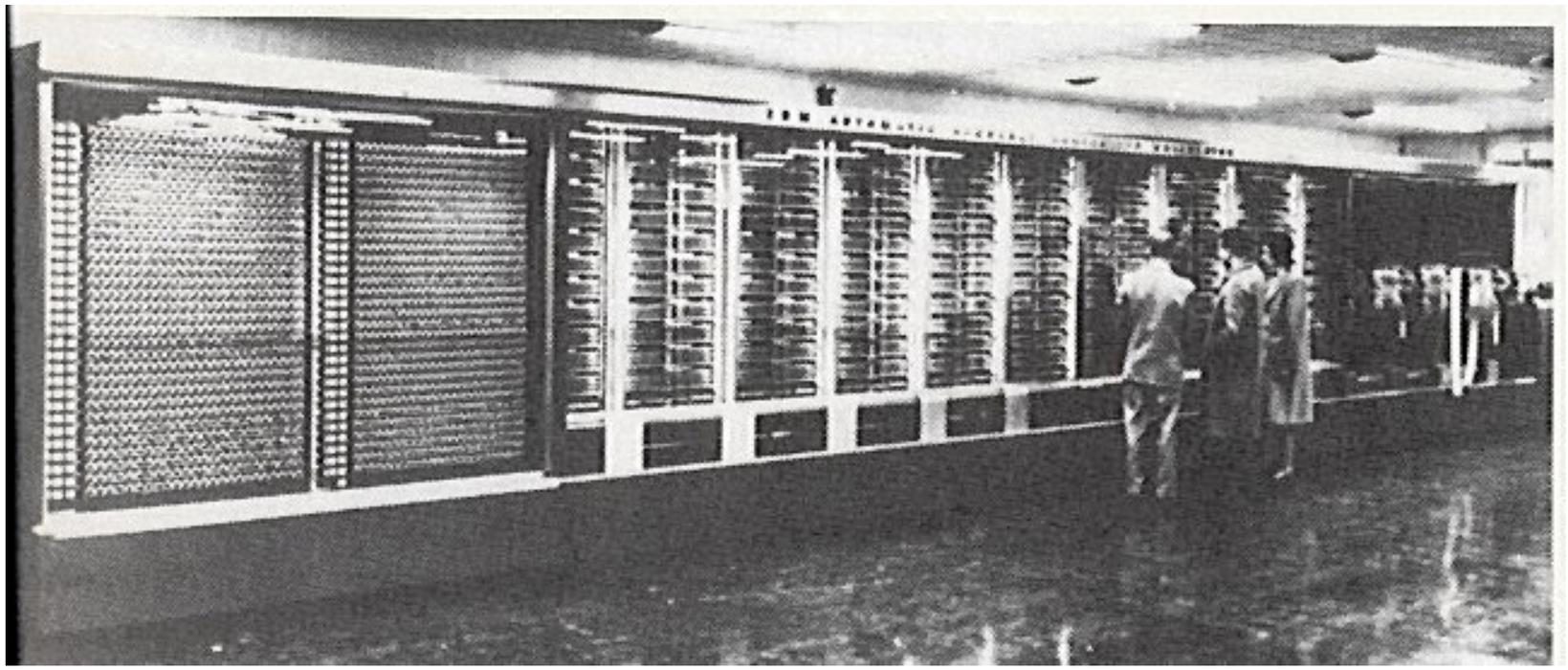
ballistics "firing tables"

human computers

Vannevar Bush
1935, Differential Analyzer

Harvard mark I

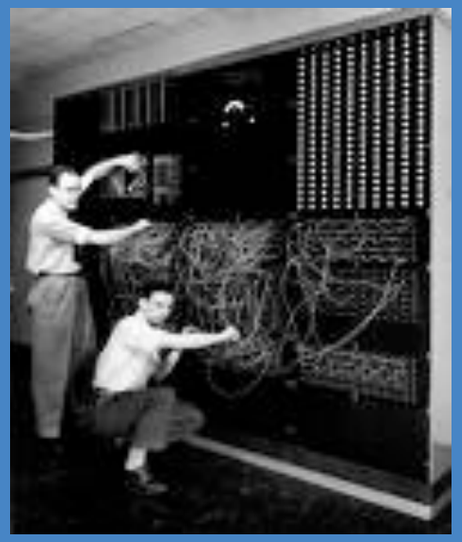
aka **IBM Automatic Sequence Controlled Calculator**



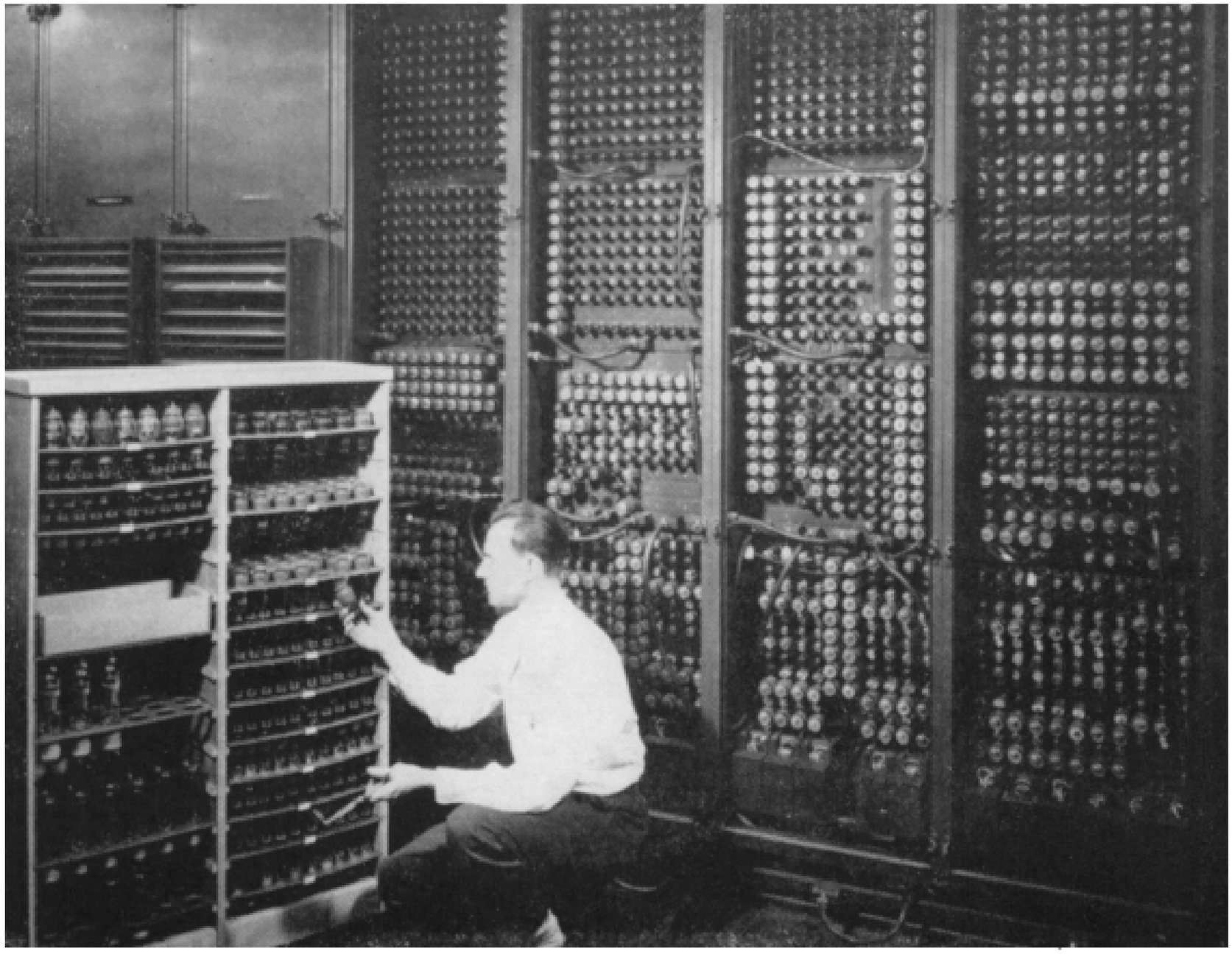
so what?

"I went to see Professor Douglas Hartree, who had built the first differential analyzers in England and had more experience in using these very specialized computers than anyone else. He told me that, in his opinion, all the calculations that would ever be needed in this country could be done on the three digital computers which were then being built—one in Cambridge, one in Teddington, and one in Manchester. No one else, he said, would ever need machines of their own, or would be able to afford to buy them."

--Lord Bowden, *American Scientist* 58 (1970) pp. 43–53



military processing

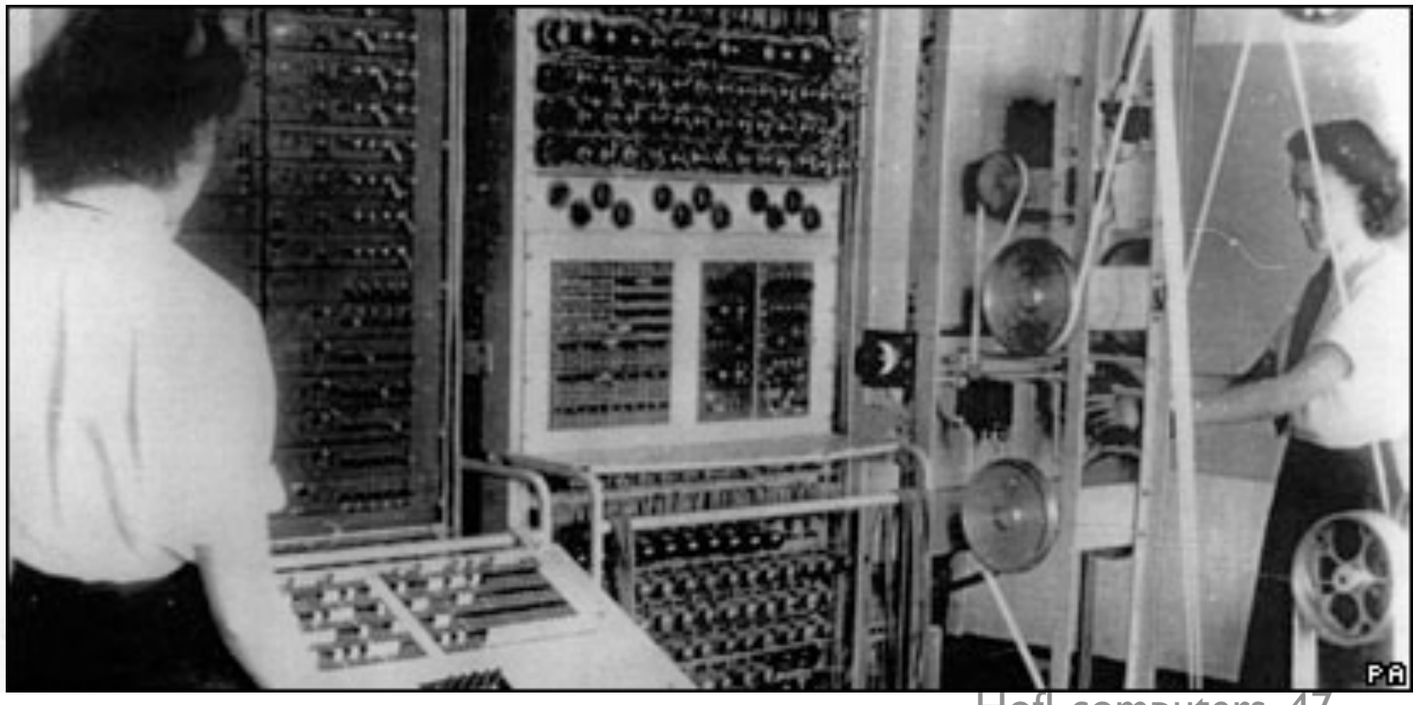


decoding

1943, Colossus

Bletchley Park

(what about the Poles?)



back in business vertical integration


LEO 1

John Simmons
Lyons & Cambridge (1947)

ENIAC

EDVAC

UNIVAC

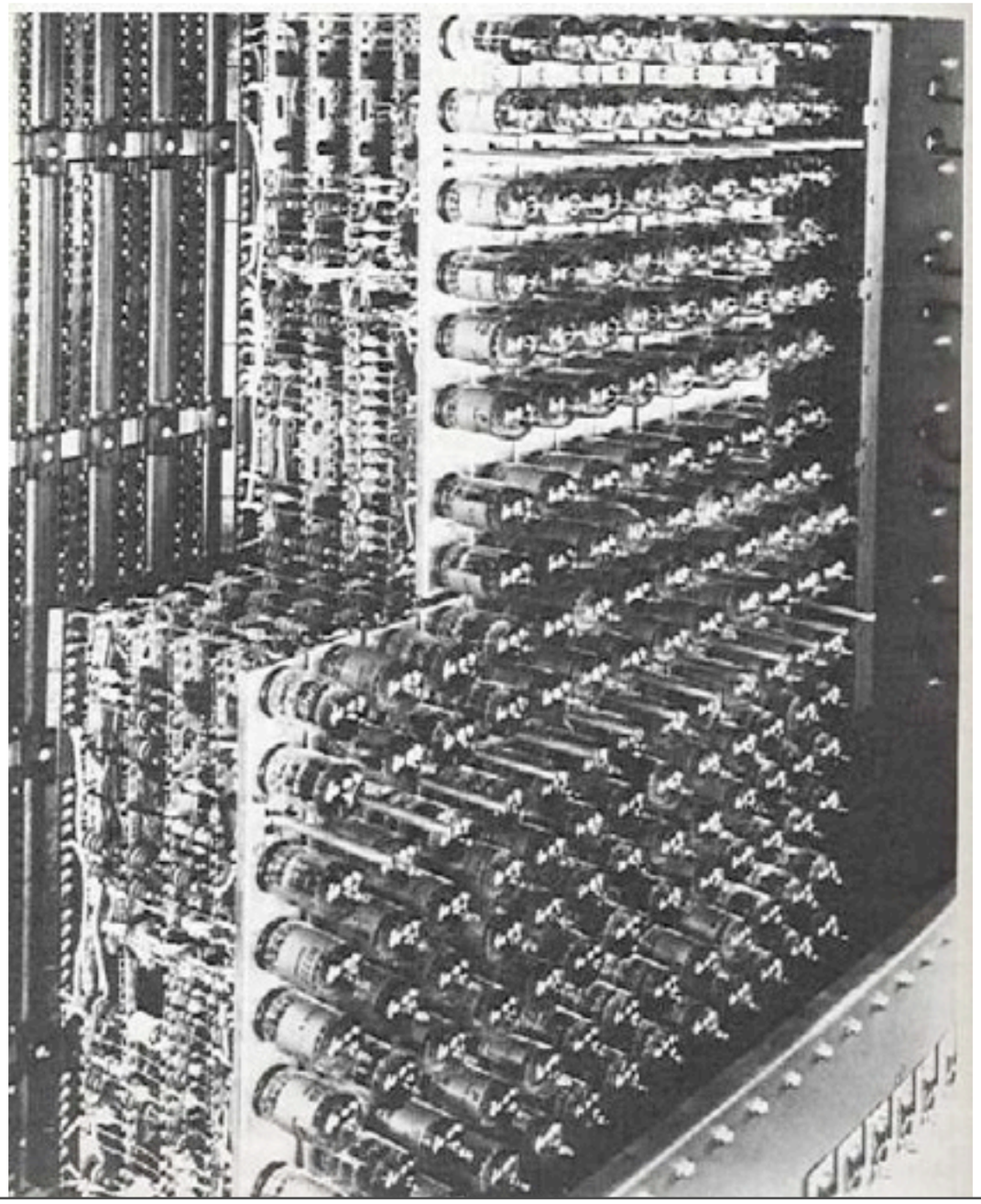
EDSAC

1954
LEO (Lyons electronic office)
CLEO (Clear language for expressing orders)

from payroll to baking

breaking down

Cathode-ray tube memory, from the IBM 701 Defense Calculator, 1952



breaking things down

1947 transistor

Bell Labs

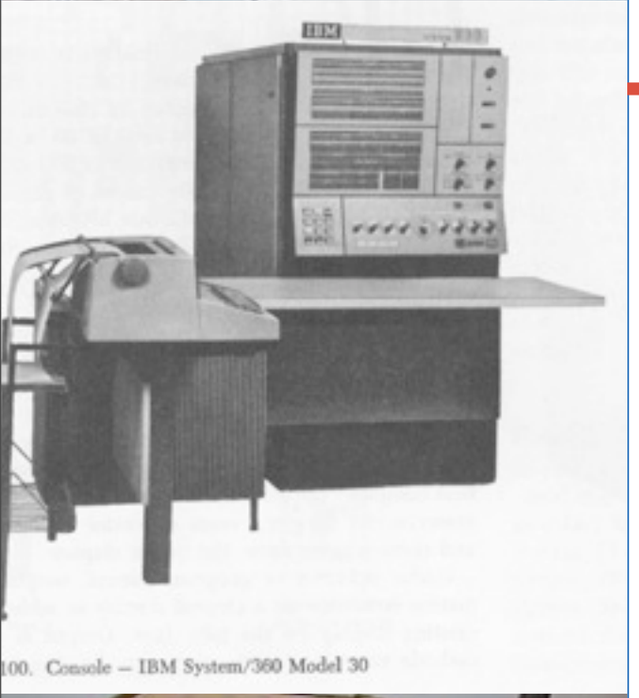
John Bardeen, William Brattain, William Shockley

1958 integrated circuit

Texas Instruments

Jack Kilby

Shockley
Fairchild
Intel



100. Console – IBM System/360 Model 30

corporate computing

1960 DEC PDP-1

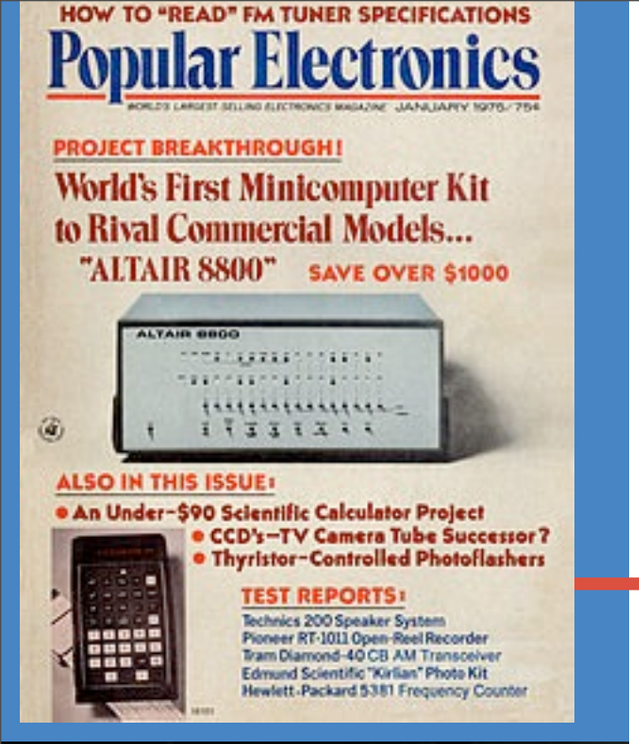
"programmable data processor"

1964 IBM 360

1969 Xerox PARC

"the architecture of information"

(**1946** SRI)



culture clash

home brew, fone freaks

1975 Altair

1976 Apple I

1983 Lisa

1984 Macintosh

culture clash

home brew, fone freaks

1975 Altair

1976 Apple I

1983 Lisa

1984 Macintosh

vertical disintegration 1970-1990

Software	IBM
OS	IBM
CPU	IBM
Hardware	IBM

computer

vertical disintegration 1970-1990

Software	IBM	DEC
OS	IBM	DEC
CPU	IBM	DEC
Hardware	IBM	DEC

computer

vertical disintegration 1970-1990

Software	IBM	DEC	3d party
OS	IBM	DEC	Apple
CPU	IBM	DEC	Apple
Hardware	IBM	DEC	Apple

computer

vertical disintegration 1970-1990

Software	IBM	DEC	3d party	3d party
OS	IBM	DEC	Apple	AT&T-Unix
CPU	IBM	DEC	Apple	Sun
Hardware	IBM	DEC	Apple	Sun

computer

vertical disintegration 1970-1990

Software	IBM	DEC	3d party	3d party	3d party
OS	IBM	DEC	Apple	AT&T-Unix	Microsoft
CPU	IBM	DEC	Apple	Sun	Intel & co
Hardware	IBM	DEC	Apple	Sun	[IBM]/OEM

computer

brand wars

computer power

computer power

OS?

computer power

OS?

processor?

computer power

OS?

processor?

hard drive?

computer power

OS?

processor?

hard drive?

2000
6 hard drive companies

computer power

OS?

processor?

hard drive?

2000
6 hard drive companies
196 million disks

computer power

OS?

processor?

hard drive?

2000
6 hard drive companies
196 million disks
0 profit

computer power

OS?

processor?

hard drive?

```
2000
6 hard drive companies
196 million disks
0 profit

Dell: 7%
```

computer power

OS?

processor?

hard drive?

2000
6 hard drive companies
196 million disks
0 profit

Dell: 7%
Microsoft: 31%

computer power

OS?

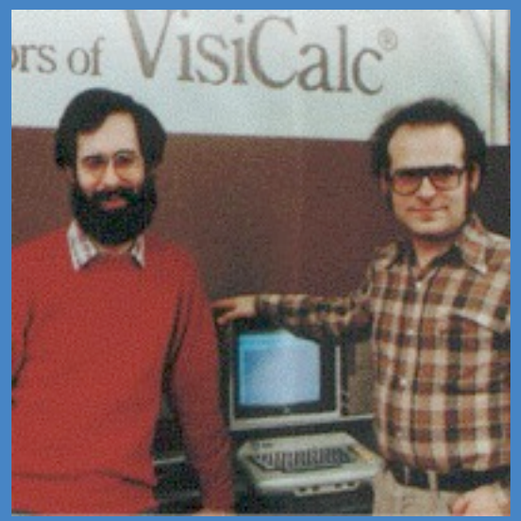
processor?

hard drive?

2000
6 hard drive companies
196 million disks
0 profit

Dell: 7%
Microsoft: 31%
Intel: 13%

Charles Simonyi
Xerox PARC



Dan Briklin &
Bob Frankston
HBS

killer apps

Bravo, 1974

Visicalc, 1978

Lotus 1-2-3, 1983

Excel (for Mac), 1984

Ken Thompson
Dennis Ritchie
Bell Labs

unix

Thompson, Ritchie, & AT&T

1965: AT&T, MIT& GE work on multics

1969: multics to unix

"What we wanted to preserve was not just a good environment in which to do programming, but a system around which a fellowship could form. We knew from experience that the essence of communal computing, as supplied by remote-access, time-shared machines, is not just to type programs into a terminal instead of a keypunch, but to encourage close communication."

--Ritche, "Evolution of the Unix Time-Sharing System"

unix at ucb

Bill Joy
UCB

1973: Thompson at Berkeley

Bill Joy develops em editor

1977: 1BSD released

1979: 3BSD (for Vax)

1981: 4.1BSD

1983: 4.2 BSD (with tcp/ip stack)

1-800-ITS-UNIX

SO ...

1991: Networking release 2; 386 BSD

1992: AT&T sues UCB

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY

UNIX SYSTEM LABORATORIES, INC. Plaintiff, vs. BERKELEY SOFTWARE DESIGN, INC., and certain named individuals in their collective capacity as The Regents of the University of California, Defendants.	Civ. No. 92-1667 O P I N I O N

settlement

1994 settlement: USL, UCB, Novell

SETTLEMENT AGREEMENT

This Settlement Agreement is entered into between UNIX System Laboratories, Inc. ("**USL**"), a Delaware corporation, and The Regents of the University of California (the "**University**"), a California corporation.

Recitals

1. USL contends it is the owner of the intellectual property rights in portions of certain computer operating system software (the "**UNIX System**").

2. USL and USL's predecessor in interest, the American Telephone and Telegraph Co. ("**AT&T**"), have licensed the University to use certain versions of UNIX® system software,

Richard Stallman
MIT

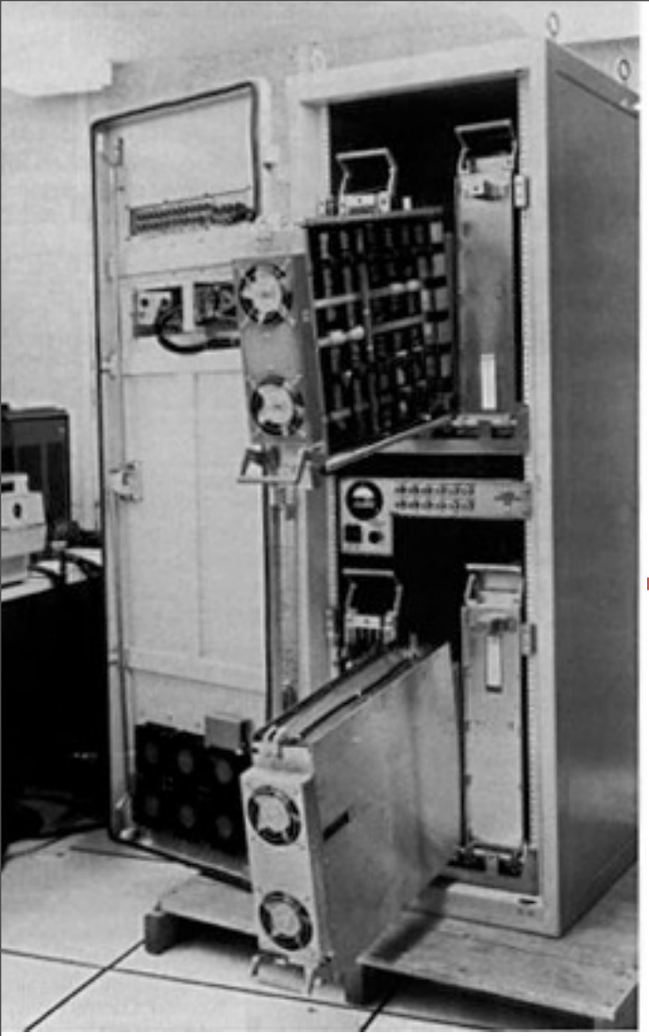
Linus Torvalds
Helsinki

elsewhere ...

MIT
1983-GNU

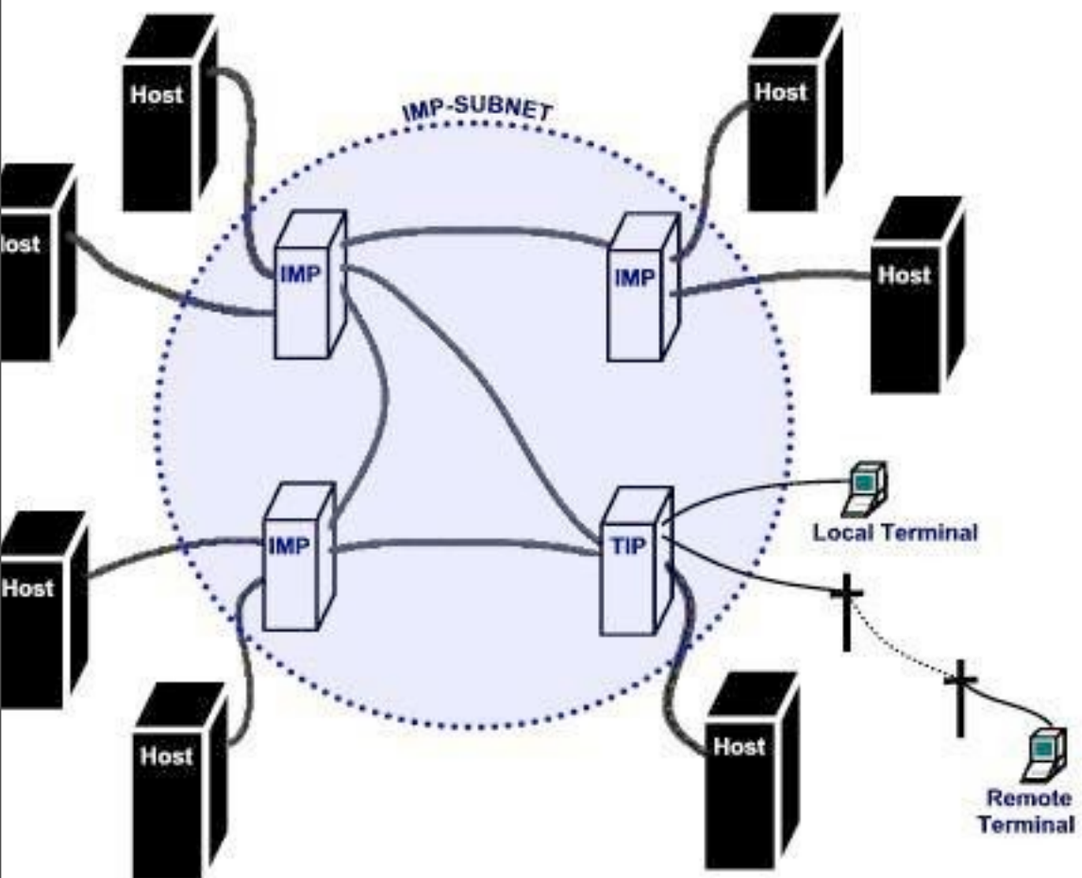
Finland 1991

```
From: torvalds@klaava.Helsinki.FI (Linus Benedict Torvalds)
Newsgroups: comp.os.minix
Subject: What would you like to see most in minix?
Summary: small poll for my new operating system
Message-ID:
Date: 25 Aug 91 20:57:08 GMT
Organization: University of Helsinki


Hello everybody out there using minix -

I'm doing a (free) operating system (just a hobby, won't be big and
professional like gnu) for 386(486) AT clones.  This has been brewing
since april, and is starting to get ready.  I'd like any feedback on
things people like/dislike in minix, as my OS resembles it somewhat
(same physical layout of the file-system (due to practical reasons)
among other things).

I've currently ported bash(1.08) and gcc(1.40), and things seem to work.
This implies that I'll get something practical within a few months, and
I'd like to know what features most people would want.  Any suggestions
are welcome, but I won't promise I'll implement them :-)
```



network of networks

1965-1969 , Packet switching,
Norman Davies (NPL)
Paul Baran (RAND)



1969 SRI, BBN & the
Interface Message Processor (IMP)

the 4 node network

UCLA, SRI, UCSB, Utah

Aloha Project

technologies & applications

1971, FTP (file transfer protocol)

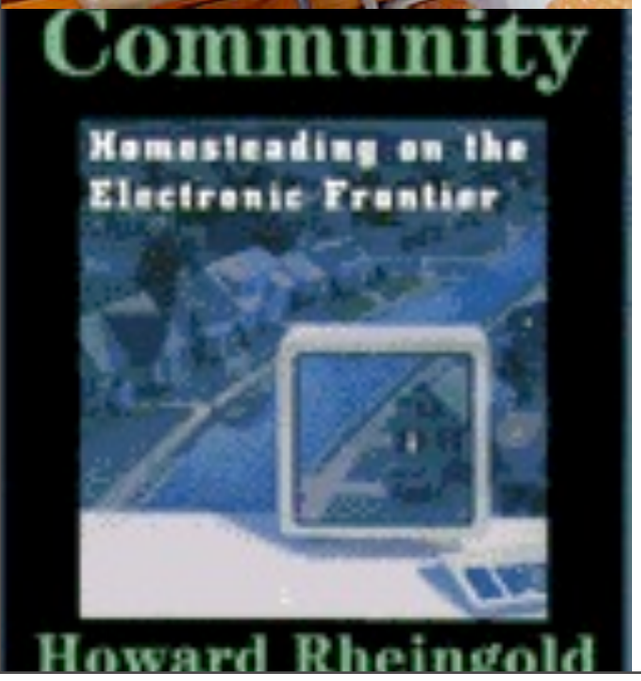
1973, TCP (transmission control protocol)

Bob Kahn, Vince Cerf

1971 email

Ray Tomlinson (BBN)

"user@hostname.domain"



communicating

1972 bulletin boards

Berkeley "community memory project"
Leopold Records, Durant Ave

1980 usenet

towards peer-to-peer architecture

1982 minitel

a better phone book

1985 the well

Fibre-optic submarine cable systems

In service

Planned

Damaged

Alexandria, Wednesday

A ship's anchor accidentally cuts two cables, SeaMeWe4 and FLAG Europe-Asia, reducing internet capacity in Asia by 75%

Taiwan, 2006

Six of the province's eight cable disasters, when undersea landslides cut nine cables between Taiwan and the Philippines, disabling internet access for weeks

ASIA

Asia has an enormous number of internet users, 1.1 billion of the world's 1.5 billion total. And it's growing by 18% per year

UNITED STATES

JAPAN

CHINA

INDIA

AUSTRALIA

NEW ZEALAND

AFRICA

PACIFIC OCEAN

ATLANTIC OCEAN

INDIAN OCEAN

"Via Easter

GREENLAND

ALASKA

CANADA

SIBERIA

MONGOLIA

CHINESE REPUBLIC

TIBET

INDIA

ARABIA

BRAZIL

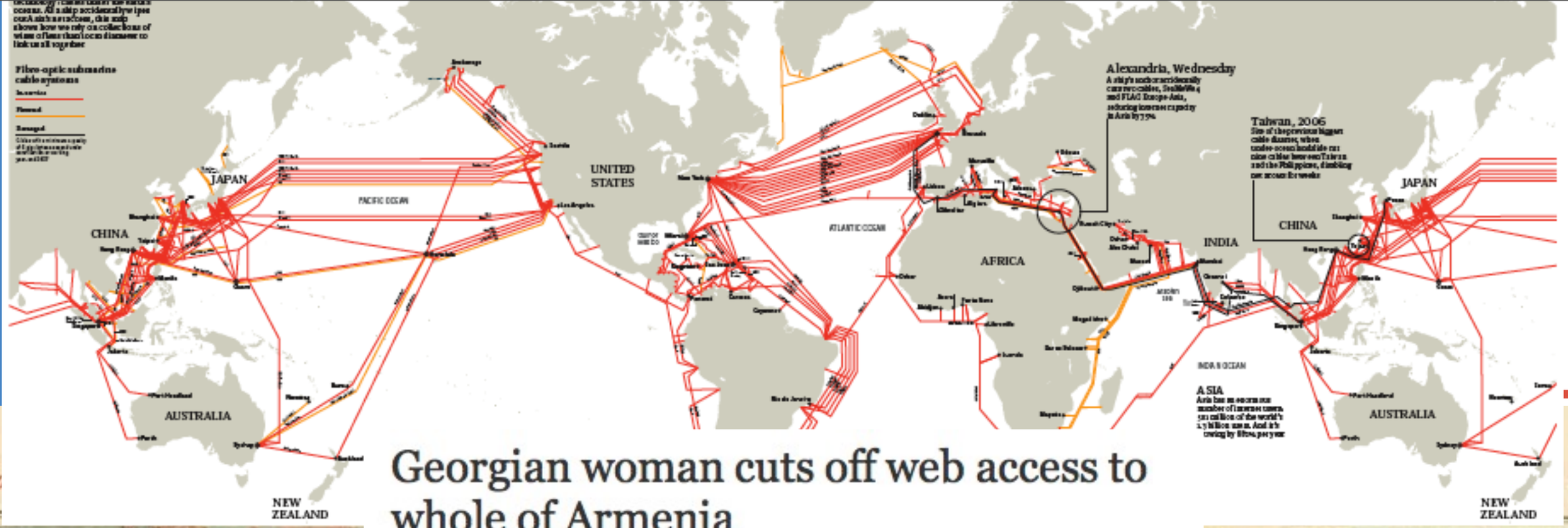
NORTH ATLANTIC OCEAN

SOUTH ATLANTIC OCEAN

PACIFIC OCEAN

INDIAN OCEAN

The figures inserted on certain cables indicate the number of cables between the points connected



Georgian woman cuts off web access to whole of Armenia

Entire country loses internet for five hours after woman, 75, slices through cable while scavenging for copper

Tom Parfitt in Moscow

guardian.co.uk, Wednesday 6 April 2011 20.12 BST
Article history

towards the web

Vannevar Bush
NSF

1945, Vannevar Bush
"As We May Think"

"memex"

1965, Ted Nelson

"Hypertext"

Tim Berners-Lee
CERN

www

towards a better phone book?

1990, HTTP

CERN http://info.cern.ch

Welcome to info.cern.ch

The website of the world's first-ever web server

MARCH 2009: A CELEBRATION OF 20 YEARS OF THE WEB
World Wide Web@20
» visit the www@20 site

opening the net

1990, ARPANET shuts down

1991, NSF opens internet to commercial use

1995, NSF ends support of infrastructure

1995, Apache

1998, Internet Corporation for Assigned Names and Numbers (ICANN) established to oversee domain names and IP addresses

commercial service

gated communities

Compuserve

Prodigy

AOL

commercial service

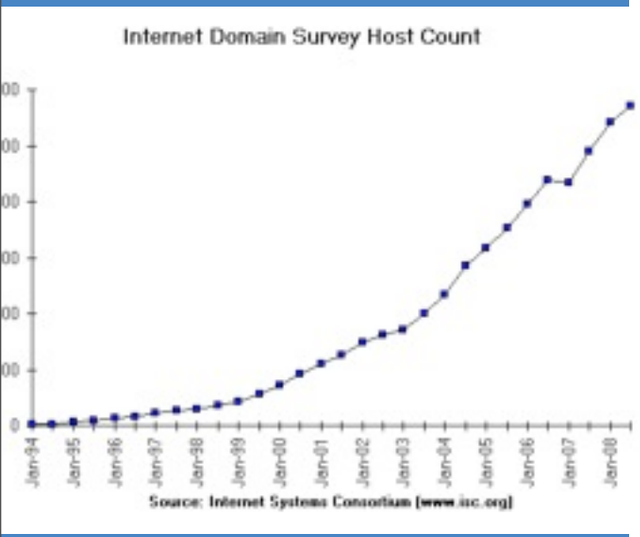
gated communities

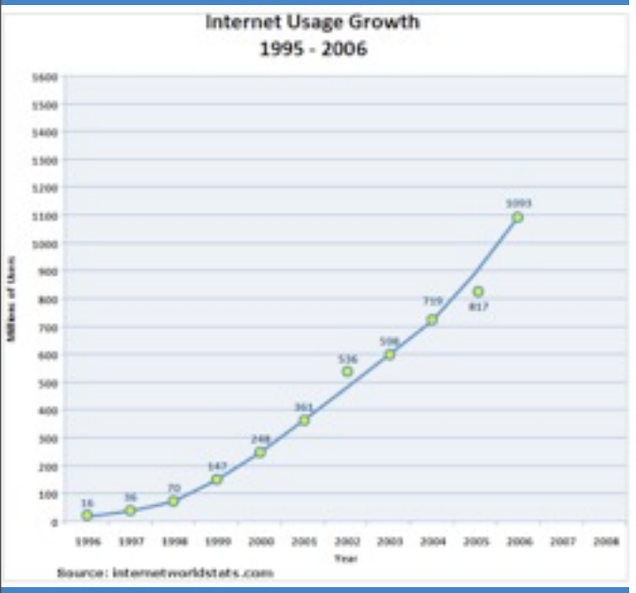
Compuserve

Prodigy

AOL

facebook?





the browser

1993, NCSA Mosaic
Mark Andressen

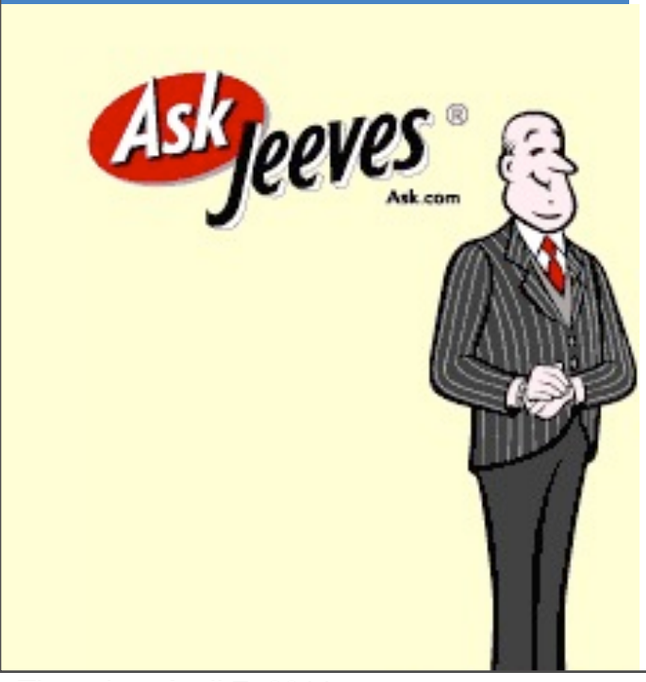
CERN releases W3 technology

1994, 200+ HTTP servers; traffic up x 1,000

1994, Netscape

1995, Internet Explorer

coming up:
finding our way around



1988, WAIS

1990, Archie

1992, Veronica (Gopher)

1994, Lycos

1995, Alta Vista, Yahoo

the story so far

registering

predicting

calculating

controlling

communicating

infrastructure